

Loss of radiant heat also increases, both from insulated and uninsulated surfaces. This cycle of more blowers to remove more heat to lose more heat to remove more heat is extremely undesirable. Of course, the obvious solution is to insulate efficiently in the beginning.

In every power plant there is a heat loss from all heated surfaces and a heat loss to all cooled surfaces.

Heat loss may occur in three ways; by conduction, by convection, and by radiation.

The manner of heat flow is most important in insulation because it is the low conduction which results in the greatest temperature differential between a hot insulated surface and the atmosphere (as in steam piping insulation), or the relatively warm atmosphere and a cold surface (as in refrigerating plant insulation). Conduction is associated with solids and comparison of materials in this respect is measured by a factor called the "thermal conductivity" which expresses rate of conductivity in British thermal units (BTU) per inch of thickness per hour per square foot of area per degree Fahrenheit temperature differential.

Radiation is the method of heat transfer by which a hot body gives off energy in the form of radiant heat which is emitted in all directions. The surface condition greatly affects the ability of a body to radiate heat. Dull, dark, rough surfaces (such as CMIO pipe), are the best radiators.

In order to minimize the transfer of heat from or to a body which is hotter or colder, respectively, than the surrounding atmosphere, thermal insulation is applied. Thermal insulation is a material or materials of low thermal conductivity.

While increasing the economy of the plant, thermal insulation, (as was mentioned previously), reduces the quantity of air necessary for ventilation and cooling requirements and prevents injury of personnel due to contact with hot parts of apparatus. It also insures more uniform heat distribution within equipment. Another function of thermal insulation is to prevent "sweating" of cold surfaces on which atmospheric moisture condenses thus causing undesirable dripping as well as accelerated corrosion of the metal.

I wish to emphasize that insulation must be sufficiently effective to reduce heat losses and lower surface temperatures to a degree which will permit habitable conditions in a specific space or compartment.

Insulating materials must possess certain characteristics.
These are:

- a. Low heat conductivity.
- b. Noncombustibility
- c. Lightweight.
- d. Capability of easy molding and application.
- e. Moisture repellent.
- f. Noncorrosive, insoluble, and chemically inactive.
- g. Composition, structure, and characteristics unchanged by temperatures at which it is to be used.
- h. Once installed, should not cluster, become lumpy, disintegrate or build up in masses from vibration.
- i. Vermin proof.

All of us are familiar with the available forms of insulating materials such as:

- a. Moulded sectional pipe covering:
 - (1) Magnesia
 - (2) Diatomaceous earth
 - (3) Cork
- b. Block
 - (1) Magnesia
 - (2) Diatomaceous earth.
 - (3) Cork
- c. Blanket insulation
 - (1) Amosite
- d. Plastic
 - (1) Magnesia cement
 - (2) High temperature cement

These familiar materials have been with us and in use on ships as long as any of us can remember.

During World War II a few changes in materials were made. Unibestos, which is amosite in pipecovering sectional form, was introduced. Also, we started using blanket insulation such as glass on ventilation systems. After the carrier Lexington was sunk, as well as because of uncontrollable fires on other battle-struck vessels, we substituted asbestos cloth and glass cloth for canvas as a lagging material.

Until recently, methods of installing insulating materials remained almost the same as always. Probably the most radical change was that of substituting the use of adhesives for the needle and thread in the application of cloth lagging.

Greater efficiency of power plants dictates increases in both pressures and temperatures used. Aside from the problems of metallurgy and fabrication of piping systems Pipe Shops must be increasingly alert to the need for more effective insulating materials and processes.

Developers of insulating materials have, in the last few years, produced many new insulating materials. Many of these lend their characteristics readily and favorably to shipboard uses.

We are familiar with the problems encountered in insulating deck steam lines aboard tankers. Because a loaded tanker in heavy seas has its decks constantly awash, insulating materials such as magnesite, which readily absorb salt water, are of little value. Each time insulation absorbs salt water, salts are introduced into the material. The pipe is heated, water being evaporated and leaving the salts. Each subsequent soaking brings additional salt until the insulation is filled with foreign material and becomes entirely useless.

Any solution to the problem of deck steam piping insulation demands that the insulation be completely water-proofed.

Two solutions offer themselves: the first, and possibly most obvious, would be to replace the catwalk on the deck of the tanker with a waterproof tunnel-like passage from forecastle to poop deck. This would permit personnel to travel the length of the ship in foulest of weather. On its overhead and sides could be placed piping and electrical conduits out of the weather.

The second solution, and the one being employed at Long Beach, is to insulate deck steam piping with a non-absorptive material. We use Foamlite sectional insulation. This is a material which meets all requirements for insulation. However, because of its nature all contact surfaces must be cemented together with a waterproof adhesive. The adhesive which we have been using is not adequate in that it does not set up quickly enough nor is strong enough for our purpose. However, we have discovered an adhesive called Tuff-Bond, manufactured by the Goodloe E. Moore Company of Danville, Illinois, and which apparently will cohere any two substances.

If Tuff-Bond delivers as well as we expect it will solve still another problem, that of attaching insulation fastenings to surfaces to be insulated, such as ventilation ducts.

This material has not received BuShips approval. However, we have requested evaluation from them.

As we all well realize, refrigeration insulation has been a problem area through the years. This was a problem area during World War II because of the acute shortage of insulators who were capable of applying cork insulation properly. The cutting and fitting of cork to exact measurements, particularly in confined areas requires considerable skill and is time consuming.

The Foamglass and adhesives which are used on truck steam lines seem to be the answer to the refrigeration insulation problem.

We have insulated one complete refrigeration system on a Destroyer with this material and it proved to be satisfactory.

No appreciable savings in labor costs were realized but the material costs were much less. This is an important factor as insulation often costs more than the pipe on which it is applied.

We are also applying Foamglass on chilled water lines, and plan to discontinue the use of cork as an insulating material.

In addition to the chilled water piping, we have many miles of cold water piping such as flushing and fire systems. Present specifications call for the application of blanket type insulation (Amosite) to cold water piping. This is a dusty, time-consuming chore which requires considerable skill to produce a neat appearing completed job.

Instead of cork and blanket insulations on chilled water and cold water systems another material might be used. This is Armstrong's Armaflex. Armaflex is furnished in a variety of sizes up to 24" I.P.S., as a long cylinder or tube.

In new installations, this material can be slipped over the pipe, pushed back from the joints for sil-brazing, and then returned to position. A fitting cover is installed with contact surfaces cemented and the job is complete except for painting. Being flexible, the material can be bent around curved piping easily.

On old installations the tube is slit, slipped over the pipe, contact surfaces are then cemented, and the job is finished.

Using the appropriate larger size material, fitting covers can be fabricated easily.

Probably best of all, in cases of national emergency, with skilled labor unobtainable, new employees could be trained to install Armaflex in a minimum period of time.

Another, and even more startling development, is a plastic material developed by the American Latex Company of Hawthorne, California. The material, StaFoam, is applied very simply by spraying, similar to the application of a heavy coat of varnish, with the catalyst being added in the nozzle of the spray gun. Within a few minutes of application StaFoam bubbles up to about 5/8 of an inch, or even thicker, depending on the thickness of the spray coat. It then air-cures in a few hours. The finished product resembles magnesium insulation in color and resembles in texture.

StaFoam is not intended for use on hot installations. While it will not support combustion it would best be suited for use on cold water piping and ventilation ducts.

Because StaFoam is a new product, and one which offers so many possible applications, I have brought along copies of its literature for each of you who desires them.

In a period of only a few years we may well be insulating all ventilation, fire, flushing and refrigeration installations, with this or a similar material, saving sums which I hesitate to estimate. Equally important is the possibility of being able to apply a completely vapor-proof barrier on all cold surfaces.

These new materials also offer a means of combating one of the most insidious of occupational diseases, Asbestosis, by replacing amosite as an insulating material to a considerable extent.

Amosite is a form of asbestos which is coarse in texture and of a varying color from ash gray to brown.

The asbestos which we use is a mineral as much as is the rock in which it is found. Furthermore, its principal ingredient is silicon, which is responsible for the disease which we know as silicosis.

Asbestos, or silicosis, is caused by prolonged breathing of silica dust. Asbestos, when handled dry, produces vast amounts of silica dust. In new applications the material can be dampened to reduce the amount of dust liberated. However, the specified type of amosite for use on cold water piping is water repellant. Also material which must be removed from an existing installation is dry and powdery, being an excellent dustproducer.

The most apparent symptom of asbestosis is lethargy or a lack of vitality. What we suspect to be lead in the posterior might well be asbestos in the lungs. During 1936,

eleven deaths from asbestosis were reported on the Pacific Coast alone. One insulator died of asbestosis at the age of 29.

Asbestosis is extremely difficult to detect -- particularly in the early stages. I know that two of my insulators are now afflicted with this condition. How many more will become afflicted is something which I hesitate to predict. Again, the solution is obvious. Remove the cause by substituting other products such as Armaflex and Staveam for asbestos wherever possible. However, this will take some doing.

In the meantime, the answer is the wearing of respirators by all who handle asbestos products. To many the very idea of wearing respirator is repugnant. However, a respirator on the face is preferable to asbestos in the lungs.

Therefore, gentlemen, ours definitely is the important and difficult task of providing and installing effective insulating materials aboard Naval Vessels. Moreover, this task must be accomplished without sacrificing our workmen in the process.

The End

A Discussion of

Mr. O. W. Meeker's Talk Follows

Mr. Winslow:

Do you know that Poly-Vinyl loses its resiliency over a period of time? The fittings, you can pull them right off. They depend on resiliency to make the joint and we have removed four or five thousand of them.

Mr. Stecher:

We are hoping to clear this up in the months ahead.

Mr. Miller:

That plastic tube will be bent in the same way?

Mr. Stecher:

The pipe is being bent with hot water or steam.

Mr. Lord:

We use a lot of them and we get better results with hot air.

Mr. Stecher:

Any more questions? Alright then we will show this film on plastic piping for washdown systems.

Mr. Chamberlain:

Gentlemen, we are fifteen minutes behind schedule. Thank you very much, Mr. Stecher, for a very interesting presentation.

Our next speaker this morning will be Mr. Meeker from Long Beach Naval Shipyard, who will speak to us on "Pipe Insulation Processes and Procedures."

Mr. Meeker!

Mr. Stecher:

I missed one point what was the complaint about unibestos?

Mr. Meeker:

It is too rigid.

Mr. Stecher:

What do you mean by too rigid?

Mr. Meeker:

It's just that. It has no flexibility, it cracks. And is a poor insulating material.

Mr. Stecher:

It's one of the best insulating materials as regards the high coefficient of heat.

Mr. Meeker:

It's very good in the laboratory and on paper, but when you install it takes a lot more time and breaks in shipment.

Mr. Winslow:

We never use it, we have had trouble with it.

Mr. Chamberlain:

Olen, there is one thing you mentioned that interests me and that is Stafoam you indicate that it is only for cold surfaces. Do you know if any research is being conducted to see if it can apply to a hot surface in a spray manner?

Mr. Meeker:

No, I went over to the Union Oil Refinery about three weeks ago looking for new material. It doesn't work out good on hot pipe.

Mr. Chamberlain:

How would it work on a heated space such as on a DL class vessel?

Mr. Meeker:

It would not work very good in there. It is not approved for that.

Mr. Chamberlain:

Have you any literature or information on it?

Mr. Meeker:

A small amount in my hotel, I think. I will bring it over if I can remember it.

Mr. Chamberlain:

If you don't, just drop it in the mail. I would appreciate it. Thanks.

Mr. Ferris:

George, if you will contact DuPont Company you will get all the

Mr. Ferris:
(Continued)

information. They developed this
type of insulation.

Mr. Chamberlain:

Have you used it, Larry?

Mr. Ferris:

I have seen experiments on it,
I haven't used it.

Mr. Stoecker:

It will not stick to metal, I saw it
tried on the inner and outer panels of
voids, it rises up like yeast and
fills up the whole void. I don't
think it will stick to metal.

Mr. Meeker:

The particular stuff we are trying out
is sticking. It may not last, I don't
know about that.

Mr. Chamberlain:

How about your shop, Mr. Lucas?

Mr. Lucas:

We've been using the conventional type
of insulation.

Mr. Ferris:

In one part of Mr. Meeker's speech it
was very interesting due to the fact
that a couple of years ago this
Asbestosis in the workers was quite
a scare. As you know, a person using
this material has to be X-rayed at
regular periods, they will tell him
to come back in a much shorter interval.
This was brought to the attention of
Union leaders. Fourteen out of one
hundred and twenty-six had Asbestosis,
and possibly by now a higher percentage
have it. Attention was brought some-
time ago to the high rate of sick
leave for lung and throat trouble,
and the Hygiene Officer, said there
was nothing to it. Then we had a
letter from the Bureau. The order is
for them to wear masks, because
fourteen people have brought suit
against the Government. Now, if you
haven't told these people to put on
masks, you are more or less the cause
of their trouble. You are

Mr. Ferris:
(Continued)

knocking the Government case into
a cocked hat.

Mr. Stecher:

I go along with that.

Mr. Ferris:

I think everyone, who has people doing
this type work, should warn their people
regarding the handling of this material.
With the proper handling of it on the job,
and it has always posed a very big problem,
because the men don't want to wear the
masks, or get this dread disease. It is
difficult to protect them. After a couple
of years of mandatory wearing of masks I
think they should realize the danger. I
think everyone ought to enforce the wearing
of masks. Don't forget this is something
that injures people's health. We should
do something about it--and fast, and I am
convinced that what we are doing is not enough.
We should not have people handle this
material without protection.

Mr. Meeker:

Any more questions?

Mr. Chamberlain:

If there are no more questions, this
would be a good time for a short recess.

Mr. Whitthorne:

Just a minute, George, please. In behalf
of myself and all the other Master
Mechanics present at this, one of
the most wonderful conferences given
in any Shipyard - in fact I have
never seen anything like what you have
done, I wish to express our appreciation
for your efforts.

Mr. Chamberlain:

Thank you, Mr. Ferris. We always want you to
have pleasant memories of us here in
Boston, remembering that the Boston
Naval Shipyard was host to the first
Pipe and Copper Master Mechanics' Conference.
Let us hope that we will soon meet again.

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Exhibit 17

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CE 742

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7 Jan 1958

DEPARTMENT OF THE NAVY
Bureau of Ordnance
Washington 25 D. C.

NAVORD INSTRUCTION 5100.21

From: Chief, Bureau of Ordnance
To: Distribution List

Subj: Safety Handbook for Pipefitters

Ref: (a) NAVORDINST 5100.13 of 10 Aug 1956, Subj:
Industrial and General Safety and Industrial
Hygiene Manual

1. Purpose. This instruction promulgates a Safety Handbook for Pipefitters. This is one of the safety handbooks to be issued in accordance with Chapter 4, paragraph 3 of reference (a) as an aid in the safety indoctrination of employees so that accident prevention can be further improved in the Naval Ordnance Shore Establishment.

2. Background. A number of activities have suggested that the Bureau issue safety handbooks for trades rather than have each activity develop its own similar set of such handbooks. Smaller activities, in some cases, lack the facilities for the development of such handbooks. A set of the more common handbooks has been developed in loose-leaf format with the intent that stations desiring to use them can modify them to suit local conditions. This is one of a set of fifteen handbooks being issued at this time.

780600

2340 CCF997

SAFETY HANDBOOK

2. Coverage. The safety rules listed in this handbook are of necessity, limited in number and are not intended to cover all applicable safety rules. This handbook does not supersede or replace any existing safety regulations but is provided as an additional safety instruction and reference training aid.

3. Action. Prior to making distribution of this safety handbook, addresses are requested to review the handbook and make any pertinent additions and changes considered desirable, depending upon local conditions.

F. E. WILKINSON

W. E. Wilkinson

G. P. ENRIGHT
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NAVJORDINST 5100.21

Requests for additional copies of NAVJORDINST 5100.21 should be submitted to either the General Supply Depot, NSC Norfolk or the General Supply Depot, NSC Oakland.

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SAFETY HANDBOOK

FOREWORD

There are certain fundamentals in accident prevention that must be observed if one is to have a safe operation, regardless of what the assignment may be. There are safety factors that should be considered. Personnel should use this information off-the-job for safety in any work they do. A good example is working from ladders and scaffolds. Injuries after hours have been numerous as a result of improper procedures. One of the benefits of a good safety program is obtained from the preservation of a smooth efficient running operation. One feature of a good program is the shop stand-up meeting. These subjects should be considered in every section as topics for these conference type meetings.



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GENERAL TOPICS

Reporting of Injury. (Reference HCM 90.5) An injury, no matter how insignificant, must be reported immediately to the Medical Department. Your experience may prevent a repeat exposure because, in safety work, we learn from the experience of others.

Compensation Claim Procedure. (Reference HCM 90.5, Encl. 2) The Safety and/or Personnel Officers can assist the injured in claim procedure. However, definite steps must be taken in progression to establish a bona-fide claim.

Obtain permission on a NAVJORD 107 (Temporary Period) from your supervisor before going to the dispensary, Naval, or Public Health Hospital.

Complete a CA-1 (Employee's Notice of Injury and Original Claim for Compensation and Medical Treatment) with all details of HOW, WHEN, and WHERE the accident was experienced and include names of witnesses.

If the injury requires additional treatment a CA-2 (Official Superior's Report of Injury) should be completed.

If the injured desires compensation in his leave preference, a CA-3 (Employee's Claim for Compensation on Account of Injury) should be initiated. If augmented compensation is desirable for dependents a CA-4a (Application for Augmented Compensation for Disability) should be completed at the same time.

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APPLICABLE SAFETY RULES

Electrical Appliances. (Reference OPNAV 3491 Chapter 16) The Underwriters Laboratories approve electrical devices, so look for their seal of approval. Provide grounds for devices as required by current instructions. Never overload circuits. When in doubt call an electrician, particularly where there may be faulty wiring. People working in and around voltages should be acquainted with first aid in case of shock. Posters may be obtained from the Medical Department for training purposes. Remember that water is not conducive to good electrical working conditions and if combined with low or high voltage may prove disastrous.

Compressed Air. (Reference NAVORDINST 5100.12, page B-5) Eye injuries are prevented from the application of compressed air. Always remember to wear safety glasses with side shields. Air embolisms are possible from improper exposure to high pressure air. Use with respect, always. Improper storage facilities can prove disastrous if not controlled properly, particularly in the case of high pressure. The lines should be secured to prevent possible whipping when a break occurs. Air line regulators should have a filter in feed lines to prevent inhalation of foreign materials.

Acids - Toxic Materials. It is the fumes from these substances that are dangerous. From an explosive and insulation hazard rack has hazardous qualified labels be dangerous. An industrial hygienist should determine their values. It is advantageous when working with acids to have copious amounts of water available.

Acids have tendency to be explosive both in large and small amounts (i.e., batteries). Ventilation is a must.

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where carbon tetrachloride or methyl alcohol is used. These toxic substances are usually controlled by a Toxic Control Committee or are not allowed.

Hand Tools and Portable Tools. Inspect all tools for defects. If the tool is used for impact purposes check closely for metal fatigue. Report all defects to prevent additional exposure. Tag and indicate defects. Use the tool for the specific designed application only, and within its capacity. Get permission and instruction before using a new, strange device. Emphasis can not be too great in off-the-job, hobby work in the use of safe tools. When planning work consider what safety precautions are necessary. Use references before making plans and before giving a stand-up meeting on the subject.

Ladders. (Reference NAVORDINST 5100.13, page B-10) Inspect the ladder for defects and note that the last date of inspection is current before checking out. Use a ladder for reaching an object only within the safe distances of reach. Never over-stretch. Check the safety shoes for the proper design to meet the needs of the purpose used for finding (i.e., spiked for walls, rubber for cement, etc.). Never carry material up a ladder. Use a hand line. Metal ladders should be used continuously around electricity. Off-the-job injuries from this source have had serious results.

Lifting and Carrying Operations. Plan your work with consideration for making lifts. Lift must be a manual lift allow for room to make lifts with your knees and not your back. In all cases use mechanical aids if feasible. If you must carry material manually keep it close to your body. Whenever possible use a mechanical lifting device to prevent possible injury. Injuries from improper lifting

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are prevalent off-the-job and on-the-job. Using the proper method is a good preventive in any safety program.

18) Scaffolding. (Reference NAVORDINST 5100.13, page 9-18) Scaffolding can prove to be an accident preventive, if used properly. In many instances ladders are used where scaffolds should be installed. This consideration should be made in on-the-job plans. Materials left on scaffolds have proved to be accident makers. Tool boxes help, but good housekeeping is also an excellent accident preventive. Use your safety manual and other reference materials when making plans for work or for stand-up overalls on this subject.

Wire Ropes and Manilla Lugs. This gear should be included in periodic inspections. Do not take a chance. Inspect it yourself. This equipment will deteriorate quickly when exposed to the elements. Inspect your care as a source of prevention. There are many good references on this subject such as the National Safety Council, Safe Practices Pamphlets and Cards and OPNAV 34P1. Use them in planning your stand-up meetings on this subject. Falls caused by deteriorated lugs have resulted in serious injuries. Week-end home painters, boat builders, and hobbyists in general should be cautioned on this expense.

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VEHICLE EQUIPMENT LICENSING REQUIREMENTS

Only authorized trained operators may be assigned to vehicle equipment. Outlines for licensing are given in HCPY 150 and OP 1220. Material handling licensing should be outlined in the Station Safety Manual. Training and refresher training is a requirement for all vehicle operators. All material damage and physical injuries are reported immediately. Serious industrial injuries are reported to the Bureau as well as serious industrial accidents resulting in material damage. (NAVORDINST 5100.12). Notify your supervisor of any change in your operating status whether on-duty or off-duty. Particularly in the area of personal physical conditions.

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SAFETY HANDBOOK**PERMITTERS**

The greatest exposure of this trade is that workers come in contact with materials under high pressure such as steam and air. Due to unusual exposure to such conditions at waterplants, coverage plants, testing operations, etc., the worker must observe complete industrial hygiene practices for his own welfare. Many of the work assignments consist of manual application in close quarters. Installation, storage, and material handling. This should alert the worker to the proper techniques in lifting. Many times the worker finds himself on assignments that call for his own judgment. If the work is planned with the supervisor and the basic safety concepts are reviewed before going on the job they aid in preserving the worker's safety.

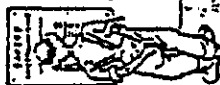
Eye Safety. Wear correct goggles for every job where there may be danger of impact, flying objects, harmful dust, gases, strong chemicals, or harmful light rays. Wash chemicals from the eyes with large quantities of clean running water, blinking the eyes repeatedly. Then get a doctor immediately. If dust or small particles get in your eyes, do not rub them. Get prompt first aid. Allow only a doctor or qualified nurse to remove anything from your eyes.

Bench Work. Keep your bench neat and orderly, and the floor free of slipping and stumbling hazards; don't let materials or debris accumulate to become a fire hazard or breed vermin. Use a brush to clean off the bench top. Tools should be placed where they cannot fall off the bench easily; have a place for each tool and keep it there. Protect the blades of sharp or pointed tools. Avoid using tools with mushroomed heads, cracked or broken handles,

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or without handles. Use only wrenches of the right size; keep jaws sharp and in alignment; keep your eyes in order.

Always use the proper tool for the job - never use makeshifts. Do not stand long materials against the bench or the wall where the way will easily. Guard against injury to others when handling long materials; place screens to protect them from flying objects. Wear goggles as protection against flying particles; wear safety shoes when doing heavy work. See that the work and other sources of light at your bench give all possible illumination without glare. Wash your hands and face thoroughly before eating and before leaving the workplace for home.



Pipecutting and Insulating. Knives should be carried in a sheath, pointed down. When cutting materials, cut from you, never cut toward you. When twisting wire around pipes, pull down sideways; never toward your face. Scaffolds should be carried in a sheath with points down. There is no danger of dropping when working overhead. When crawling, never see toward you, always from you or sideways, so there is danger of injuring yourself if the ladder breaks. When handling insulating materials on piping, always bend over so that hand lies annularly against lagging. Never force sharp ends of wire; always bend them over so sharp ends won't protrude. When

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cutting wire from coils, hold end of wire firmly to prevent end striking you in your eyes or face. Buckets and materials should be wired to piping or other fixed objects to keep them from being kicked or rolled off staging or grallings. Do not pile materials in passageways or fire lanes. Do not spread drop clothes over holes or misplaced floor plates or grallings where there would be danger of anyone stepping. Remove excess materials to proper containers. Observe good housekeeping at all times. When handling ammonia, filter glass, or unbrazed sections tight-fitting leather gloves must be worn to prevent injury to hands.

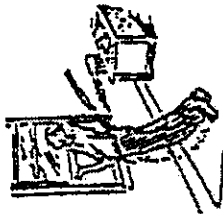
Cutting Oils and Compounds. You may be troubled with rash, pimples, or boils if you permit your skin to become plugged with dirt and oil. When putting work at noon and at night, scrub your hands and arms thoroughly with soap, warm water, and a soft brush. After each washing rub lanolin or petroleum jelly or other ointment on your skin to prevent chapping. Keep a soft brush and a soft towel handy for your own use. Do not wipe your hands with waste; metal particles on your skin or in the waste may scratch you.

Propane Gas. Leaks in propane gas lines are dangerous. Liquefied gas is equally dangerous, as explosion, fire, or asphyxiation can readily occur. In order to prevent this be alert constantly for any hazards due to leaks, faulty equipment, or mispractice. All shops and areas using propane gas must instruct and train their personnel in the precautions and safe practices to follow. This gas is 1-1/2 to 2 times as heavy as air and thus tends to seek low levels and will, for instance, progress through a system of trenches (allowed to escape in shops. Therefore, use proper precautions against fire in handling this gas.

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Refrigeration and Hydraulic. Be sure that you understand how to use ammonia safely. Check the date on which the mask was inspected at frequent intervals. Gas mask canisters which are one year old or which have been used for a total period of one hour must be immediately replaced. Do not work around ammonia flames without a mask and without a second person nearby. Wear rubber gloves and approved goggles before handling sodium dichromate or caustic. In the event that any of this material comes in contact with the skin, flush freely with water. Do not make any adjustments unless you are sure that there will be no danger to yourself, your fellow employees, or the equipment.

Silver Brazing. Only those employees who have passed a qualification test are permitted to do silver brazing. Be sure there is good ventilation. Wear eye protection. Filter lens, either pink or green, will give protection against glare and help you do a better job.



Handle compressed gas cylinders carefully. Cylinders shall not be dropped, struck or allowed to strike each other violently. Fuel gas cylinders shall be secured, transported and used in an upright position only. Cylinders shall be capped at all times when not in use. Do not permit oil or grease to come in contact with oxygen cylinders, valves, regulators, or filling. Oxygen shall not be drawn from cylinders after

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The internal pressure has been reduced to 25 p.s.i. (gauge). Do not use acetylene at pressures in excess of 15 p.s.i. (gauge). Do not use oxygen or any fuel gas from a cylinder without an approved pressure-reducing regulator. Torches and hoses shall be disconnected from cylinders when not in use and cylinders shall be capped. Gas torches and hoses must never be left unattended in confined spaces. When leaving a compartment, tank, or other confined space immediately remove the torch and hose to a well-ventilated area.

Machinery and Equipment. General Precautions. Only authorized and qualified employees are permitted to operate machines and equipment. Be sure all guards are in place and properly adjusted before starting machine. Keep tools, machines, and working space as clean as possible. Don't let stock or scrap accumulate. Clean metal borings, chips, and scrap materials. Do not handle and put it in the proper containers. Do not handle scrap with your bare hands. Do not use an air hose to clean the machine; use a brush. Clamp material securely to machine before starting the machine. Do not attempt to oil, adjust, or clean any part of a machine while it is running. Do not distract the attention of others engaged in exacting operations.

Always remove chuck wrenches from chucks immediately after you use them. If left in the chuck they will fly out when the machine is started. Loose clothing, rings, watches, and neckties should not be worn around moving machinery. Do not lean over the work so that your clothing may be caught in moving parts. Stop the machine before attempting to pick up tools or other objects lying near or in the path of moving parts. Always shut off the power before attempting to remove stock or jammed pieces of material from a machine.

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Pipe Threading Machine. Wear eye protection when operating a pipe threading machine. Tighten pipe securely in the chuck and remove chuck wrench before starting the machine. Do not run your fingers or hand over the pipe threads. Use a brush to remove chips. If you are not familiar with the machine get instructions from your supervisor before attempting to operate it.

Power Hack Saws. All work shall be properly secured before starting the blade. Keep stock in place and keep work area as neat as possible. Be sure all belts and pulley are guarded. Feet protection should be worn when operating this equipment. Keep contact off the floor. When handling heavy materials use a hoisting device.

Caulic Solutions. Lac and caustic soda will cause severe burns in the eyes and skin; therefore, close-fitting rubber framed goggles or face shield and rubber gloves shall be worn. Rubber aprons and rubber boots should also be worn when handling caustic solutions in quantity. To avoid violent splashing when making solutions, add caustic slowly to the solution and stir constantly. In case you are accidentally splashed flush the affected parts thoroughly with water, then report to the dispensary.

Acid. Use same protective equipment as for caustic solutions. Lower material slowly into acid to avoid splashing. Be particularly careful when dipping hot material. When mixing acid solutions always pour the acid into the water. Never pour water into acid. Pour slowly and stir constantly. Thoroughly flush wet acid containers so soon as they are emptied. When dipping curved pipe or coils do not submerge both ends on the pipe at the same time.

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Lead. When pouring or working with hot lead wear an apron, glasses, and eye protection. If a lead pot is used in a confined area, make sure good ventilation has been provided. Do not leave molten lead unattended. Use only approved tongs when handling molten lead. Do not use your hands or water gets into the molten lead. Wash hands thoroughly after handling lead, particularly before eating. This precaution also applies when using a lead base paint or white lead pipe sealers.

Wrenches. Inspect wrenches for sprung, cracked, or battered jaws. Do not use a wrench that does not fit the nut or bolt head properly. Keep wrenches free from oil and grease. When using an adjustable wrench, place the jaw on the side facing you and apply pressure to the wrench. Brace yourself to avoid leaning against the wrench as a hammer. Do not hammer a wrench. If it becomes necessary to use a wrench on a sawhorse or other soft hammer, do not use a pipe to extend a wrench handle for additional leverage. Do not use a thin long wrench.

Asbestos. Asbestos dust is injurious if inhaled. Wear an approved dust respirator for protection against this hazard.

Block Saws. Tighten blade firmly to prevent buckling. Apply pressure on the forward stroke only. Pull the saw back lightly to protect the teeth. Secure all material before attempting to make a cut. Keep both hands on the saw to steady it and prevent chattering. Wear your safety goggles when using a back saw overhead.

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Use the following table to determine the proper blade for the job:

Use	Teeth to Inch
Boil welded metal	14
Tool steel, iron pipe, hard metal	18
Drill rod, sheetmetal, tubing	24
Thin metal and tubing	32

Pneumatic tools shall be used only by employees familiar with and properly instructed in their use. Those shall not be laid over rail-



ders, steps, scaffolds, or passageways in such a manner as to create a tripping hazard. Air pressure shall be shut off at the manifold and pressure released from the line before disconnecting the tool from the line. When using pneumatic tools keep the exhaust directed away from your face. Eye protection shall be worn at all times when operating power hand tools. Do not use portable power tools in an area where flammable vapors may be present. Contact your supervisor if in doubt. As with

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all revolving tools, loose clothing that may catch in the machine should not be worn.

Portable Electric Tools. Use only equipment that is in good condition. Take good care of it. Be sure that the tool is properly grounded. Do not overstrain the tool, thus overloading the motor. Never use a portable electric tool in the presence of flammable vapors or gases, unless it is designed for such use.

Report the following unsafe conditions: defective or broken insulation on cord, improper or poorly made connections to terminals, broken or otherwise defective plug, and loose or broken switch.

Sharpening Hand Tools. When necessary to use a grinding wheel be sure the guards are in place and always protect your eyes with goggles. When using a grindstone, it should always be turned away from your body. Hold the tool to be sharpened firmly with one hand and use the fingers on the other to guide the blade.

Dirty oil stones may cause the tool to slip and result in cut fingers. Clean the stones by picking them in a pan and heating it; wipe the stones dry and clean while hot. Do not try to sharpen tools on a dry oil stone. Oil stones mounted in boxes are usually more stable.

Mounting Grinding Wheels on Spindles. Respect the wheel for flang and make the "ring test." Clean the bearing surfaces of wheel, flanges, and spindle so that the clamping pressure will be evenly distributed. Check the speed of the spindle to make sure that it is not running too fast for the type and size of wheel. Make sure that the hole in the wheel backing is the right size for the

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spindle (neither too small nor too large). Use flanges that are recessed and large enough to clamp the wheel well toward the conference. Use compression washers between the flange and wheel that are large as the flanges (if rubber, use washers 0.125-inch thick; if blotting paper, 0.025-inch thick).

Machinery Guards. The importance of guards may be realized easily. Picture yourself slipping, throwing out your hand to catch yourself, and finding it resting on a guard carrying some piece of moving machinery. Think what might have happened to your hand if someone had left that guard out of place. Do not remove any guard unless stop the machine first; and always replace the guard when the work is done. Before starting work at any machine make sure that all guards are securely in place. If you notice that a guard has been carelessly left off any machine, notify your supervisor. If you find that any guard is broken or breaks inadequate protection, notify your supervisor.

Thawing Frozen Pipes Inside Buildings. Never use an open flame to thaw frozen pipes inside of a building. Even though the flame may not cause a fire, the sudden local heat on metal may cause the pipe or pipe fittings to break and flood the premises with water. Hot water is the safest method to use.

Acid and Caustic Pipe Lines, Opening Flanged Joints. Wear goggles and rubber gloves. Shut off all valves controlling the contents of the pipe. Drain the pipe. Put a shield cut from a piece of sheet lead over the flanges. Keep your face well above the level of the pipe. Remove the lower bolts first then loosen the others slightly

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until the acid or caustic drips. If flanges stick past them by driving a wedge (16-penny spike sharpened) through the shield and into the joint.

Baldriffing, Mending and Patching Suggestions. Wear a safety mask protecting both your eyes and face. Wear close-fitting clothing, long sleeves light about the wrists, collar buttoned close, about shoes in good repair tightly laced, and trousers coming well down over the shoe tops. Make sure the baldriff, mending pot, ladle, and the mold or machine part into which the molten metal is to be poured are perfectly dry. To insure this, preheat them thoroughly. Inspect all baldriffs for blow holes that might contain molten metal. Avoid inhaling the fumes from the molten pot or the ladle. Insert the ladle into the lead pot edge wise so that splashing may be avoided.



Barricades and Warning Signs. Before starting any job on a public street or other thoroughfare, always place adequate barricades and warning signs. Barricades should completely encircle the street opening or other workplace. Place proper red warning flags in position to protect the workmen from traffic and also proper warning signs announcing danger to the public. If traffic is heavy, station a flagman with the proper red warning flag who will give additional warnings to all approaching traffic. At night use bright red lanterns to replace the daytime danger flags and signs. All lanterns near any

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open trench or other excavation must be securely anchored to prevent their falling into the excavation.

Trenches. Do not jump into a trench; all on the shoulder and slide in. If trench is more than 3 feet deep, use a ladder. When getting out of a trench, look all ways for traffic danger. Keep a safe distance from fellow workers, to avoid danger of striking them with tools. Keep the shoulders of the trench free from tools, water, dirt, stones, and loose earth. If possible, keep the soil bank between you and traffic. If the walls of trench contain glass, wire, and other sharp objects, remove them carefully and promptly. Trenches must be braced whenever sand or other loose soil is encountered. Keep the soil bank far enough from the edge of trench to avoid excess weight and cave-in.



Manholes. Use a proper tool to remove and replace the manhole cover. Place traffic guards around the manhole. Display DAY-NIGHT signs and bright red warning flags at night, red lighted lanterns. Have a helper guard the opening at all times. Test the manhole for gases by an approved method. If dangerous gases are present or if there is a deficiency of oxygen, ventilate the manhole. Use either wind mills, remove sufficient manhole covers, or use forced ventilation. The last method is best. Make

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sure that air delivered to the manhole is not contaminated by motor vehicle exhaust gases. After ventilation, again test the manhole. If the air content is questionable, enter it only under specific orders of your supervisor after putting on respirator protection and a lifeline. Have a helper stationed at the manhole entrance holding the life-line in his hands.

Handling Pipe, Truck and Trench. Stand on one side when pipe is being unspooled from a truck lowered into a trench. Before operations are begun, carefully inspect the ropes to be used, for defects that might cause falls of materials and injury to persons. Bad burns are caused by allowing the rope to slide through the hands. Wear gloves, and take great care to avoid strains. Always block the pipe to prevent it from rolling. When carrying pipe with others, make sure that all workmen understand the signals for lifting and lowering. These are done best with good teamwork. Take great care in handling threaded pipe - the threads are always sharp and cut the flesh easily.

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Exhibit 18



SAFETY *Review*

In This Issue:

SAFETY EQUIPMENT CONTROL
WHO IS RESPONSIBLE FOR SAFETY?
SUCCESSFUL FOOT PROTECTION PROGRAM
BULK PROPANE SYSTEM
JIG FOR BUILDING PIPE STAGING
ASBESTOSIS
SAFETY CAPSULES



Safety costs money—lack of safety costs infinitely more. We must pursue an effective, efficient safety program with the same vigor we pursue an effective, efficient program of shipbuilding, conversion and repair.

A handwritten signature of RADM R. K. James, USN, is located below the quote.

RADM R. K. JAMES, USN
Chief, Bureau of Ships

OCTOBER 1962

VOLUME 19 NO. 10

NAVY DEPARTMENT
OFFICE OF INDUSTRIAL RELATIONS
WASHINGTON, D.C.

NAVEXOS P-52

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DEFENDENT'S
EXHIBIT
Buffalo Pumps

ASBESTOSIS

Prepared by Capt. H. M. Robbins, MC, USN, and W. T. Marr, Industrial Hygienist, Long Beach Naval Shipyard

IN 1930, the first cases of asbestosis were reported in the United States. A few years later (1934), amosite, a type of asbestos, was found to be comparatively light in weight and an excellent insulator for shipboard work. By 1937, manufacturing problems were solved and the material was used productively aboard naval vessels. During the war years, shipyards had a great influx of employees in all trades, and pipe covering was no exception. Asbestos was used extensively. In 1945, a medical survey team noticed the dusty working conditions of pipe coverers and a study was made of the working environment of these employees in four shipyards. High dust concentrations were found at the time and X-ray examinations given to over 1,000 pipe coverers. Only three employees, each with more than 20 years' experience in working with asbestos material, were found to have asbestosis. This low incidence of disease and the extensive number of years the affected employees worked in the material led the investigators to conclude pipe covering to be a relatively safe operation in shipyards. Exhaust ventilation and respiratory protection were still recommended as good practices. The "extensive years" gives us an extremely important clue to watch.

Medical evidence indicates the requirement for many years of exposure to develop asbestosis.

Shipyards have two work areas, the insulation shop and aboard ship, where there is a potential exposure to asbestos fibers. Pads, like small pillows for shipboard fittings, are made in the shop. Here asbestos cloth is cut to size and filled with a type of asbestos called amosite. Recently, in this shipyard, fibrous glass has replaced amosite as the filler for these pads. Aboard ship, a great variety of insulation is performed. Insulation blocks are shaped with a saw, pads are applied to fittings, insulation cement is applied to blocks and covered with asbestos cloth. These, and other operations, take place in nearly all compartments; however, most work is done in the machinery spaces. By far the greatest potential exposure to asbestos fibers occurs during ripout of old insulation for ship overhaul or reconversions.

There is still much to be learned in the area of measurement and evaluation of asbestos fibers in the working environment. The general feeling is that asbestosis is caused by breathing relatively long fibers (10-25 microns) and that the fine asbestos dust is relatively inert. At this time, the recommended maximum allowable concentration is 5 million particles per cubic foot. Control of asbestos dust and fibers is relatively easy in the pad shop. A water supply pipe, filled with small holes, is located directly over the asbestos cloth on the end of the cutting table. As the cloth is drawn onto the table, the cloth is dampened. This cloth remains damp throughout the process of filling, sewing, and installing pins in the pads. Additional exhaust ventilation has been installed in the shop and is now operated constantly during working hours. Dust studies were made while dry cloth and amosite were in use and the ventilation off. These counts were generally in the range of 5 to 20 mppcf. Under improved conditions, the count is generally below 1 mppcf.

A pipe coverer's working environment on board ship is constantly changing, making it difficult to obtain an average dust exposure. Almost any concentration of dust and fibers can be found under varying conditions. The highest counts, of course, are during ripout where 200 mppcf are not uncommon. Due to the constantly changing work positions and areas of pipe coverers, adequate ventilation is not possible. The worker's best protection is to avoid careless creation of dusty conditions, use damp material when possible, and wear respiratory protection constantly. There is, at present, no known cure for asbestosis. Once a person has contracted the disease he has suffered a loss of health which cannot be redeemed.

For an educational program, a tape recording was made of an interview with a former employee who is now receiving disability compensation for asbestosis. This recording, along with discussion, has been presented on several occasions to encourage employees to use every means to protect themselves from exposure to asbestos fibers. Films are also periodically shown on the use of respirators.

Exhibit 19

NATIONAL CENTER FOR
OCCUPATIONAL AND INDUSTRIAL HEALTH
300 EAST CENTRAL PARKWAY
CINCINNATI, OHIO 45202

30 July 1968

REFER TO:

Vice-Admiral R.B. Brown
Chief, Bureau of Medicine and Surgery
Navy Department
Potomac Annex
23rd East Street, N.W.
Washington, D.C. 20390

Dear Admiral Brown:

As you know the Occupational Health Program of the U.S. Public Health Service has been very active in gathering environmental and medical data on the occupational hazards of asbestos. One of our grantees, Dr. Irving Selikoff of New York University, has recently completed a study of non-insulation shipyard workers' exposure to asbestos. Dr. Selikoff reports he has some very interesting data and has requested that we arrange an informal meeting with your Department and the U.S. Department of Labor to discuss his findings.

My Assistant Chief, Mr. Stanley Rano, discussed the possibilities of a meeting on August 29, 1968, with Lt. Cdr. Barboe of your staff; who suggested that we formally request that a small meeting be held at 23rd and Constitution, Building 7, on 29 August 1968. The meeting would probably consist of about six people; including Dr. Selikoff, Dr. Lewis Cralley of the Occupational Health Program, a representative of the U.S. Department of Labor, myself and appropriate members of your staff. The time and other details of the meeting can be arranged between Lt. Cdr. Barboe and Mr. Rano providing this proposal is satisfactory to you.

We are looking forward to a meeting with your staff and feel that an exchange of information will be of mutual benefit to all concerned.

Sincerely yours,

Murray C. Brown
Murray C. Brown, M.D., M.P.H.
Chief, Occupational Health Program

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Exhibit 20

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LCDR S. H. BARBOO, MSC, USN

5 Dec. 1968 5 Dec. 1968

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Vice Admiral
R. B. BROWN

Newspaper articles appearing on shipyard asbestos workers

Admiral Brown telephoned to related information he had received at the CPO's Conference of this date concerning Admiral Fahy's (ComNavShips) inquiries concerning articles appearing in the Washington Post and The New York Times. According to Admiral Brown, the articles have put the Navy in adverse publicity in that Doctor I. J. Selikoff of Mount Sinai Hospital, through the news media, stated that he has warned the Navy and other Federal departments of his findings relating to the unusual incidence of asbestosis among shipyard asbestos workers. The newspaper articles stated that the Federal agencies including the Navy have not publicized the hazards. Admiral Brown requested a complete background search and medical thinking on the subject of asbestosis; and a conference concerning this matter is to be held at his office at some time on 6 December. Admiral Brown wants a defense for why the naval shipyards were not alerted to the unusual hazards associated with asbestos and desires to know what control measures are being utilized.

6 December 1968

On this date, a meeting was held with the Surgeon General, VADM R. B. Brown, MC, USN; CAPT R. E. Rosenwald, MC, USN; and LCDR S. H. Barboo, MSC, USN. VADM Brown was briefed on the medical content of a meeting of representatives of participating agencies held at BUMED on 29 August 1968; and was appraised of current policies and control measures and research concerning asbestos exposure concerning Navy employees. VADM Brown requested that a brief letter containing this information be drafted for his signature to the Secretary of the Navy.

12/10/68

Assistant Chief for Research and Military Medical Specialties

FILE M & S GUNNER

B 300148

Exhibit 21

UNITED STATES GOVERNMENT

DEPARTMENT OF THE NAVY

Memorandum

61010:EC:tdl

DATE : 9 December 1968

Ser 1105

FROM : SEC 6100

TO : SHIP3 07

SUBJECT : Hazards of Asbestos

Ref: (a) Article entitled "U. S. Warned of Asbestos Peril" in the Washington Post, Wednesday 4 December 1968
 (b) SHIP3 0720 Memo of 4 December 1968

Encl: (1) Analysis of hazard by Cdr. Rosenwinkel, MC, USN
 (2) List of Asbestos Packing and Gasket Specifications
 (3) MIL-STD-769C, "Thermal Insulation Requirements for Machinery and Piping"
 (4) Use of Asbestos for Piping and Machinery Insulation

1. As requested during telephone conversation of 4 December 1968, the following information on the health hazards of asbestos is forwarded. This will supplement preliminary information previously submitted by Code 072 in reference (b).

2. Enclosure (1) contains a statement of the hazards associated with the handling and use of asbestos. This statement was obtained from Cdr. Rosenwinkel, MC, USN of the Bureau of Medicine and Surgery, Occupational Health Division.

3. A survey of the uses of asbestos in shipbuilding disclosed that this material is used primarily in two areas. The first is for packing and gaskets and the second is for piping, lagging, and boiler insulation. From a health viewpoint, the second area is considered to be the more important. A third use of asbestos is as a precoating on diatomite feedwater filters on LSD's. This is a very limited use, however, and is not considered to be a significant health hazard.

4. Enclosure (2) contains a list of asbestos containing packing and gasket materials, together with applicable specification numbers. All of the asbestos in these items is fabricated as cloth, rope, or compressed sheet with binders, so that the items are not friable when they are cut. Thus, these items do not cause dust in shipboard applications. In addition, in many instances, they are received already incorporated in the finished assembly, such as a valve, and do not require fabrication by the shipyard. For these reasons, packings and gaskets containing asbestos are not considered to be a significant health hazard.

5. The most important use of asbestos from a health viewpoint is for piping, lagging, and boiler insulation. Enclosure (3) includes the requirements for thermal insulation for machinery and piping. These requirements include the use of materials other than asbestos. Insofar as possible fiber-glass and calcium silicate are used. A detailed discussion of the use of asbestos for these purposes is contained in enclosure (4).

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9 December 1963
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6. It should be emphasized that probably the greatest health hazard is caused by airborne asbestos particles during "rip-out" operations, especially on ships built during and shortly after World War II. Asbestos was widely used during that time. Although respirators are specified for personnel engaged in these operations, overall control of the dust problem is extremely difficult so that persons in the immediate vicinity may be exposed.
7. Contact was made with the Industrial Hygienists of Mare Island and Puget Sound Naval Shipyards to discuss this problem. It was quite obvious from these discussions that the shipyards have for many years been aware of the hazards of asbestos and have initiated appropriate safety precautions. Insofar as possible, all fabrication work is performed in the shops where adequate safety precautions can be observed. These precautions include controlled ventilation, use of respirators, and wetting down of the material. During "rip out" operations, respirators are worn and ventilation is controlled as far as possible.
8. Mr. Bessmer of Puget Sound recently presented a paper locally on the hazards of asbestos. He agreed to forward a copy of his paper and other documents used by the shipyard for the control of asbestos to NAVSEC. If desired, this information when received will be forwarded for information.
9. The general specifications for shipbuilding allow the use of asbestos as well as other alternate materials. In practice, however, the naval shipyards use fiberglass other materials instead of asbestos as thermal insulation. Exceptions are for vertical runs and for lagging where abrasion resistance is a factor. Private shipyards, on the other hand, still use substantial amounts of asbestos. In many cases, however, the asbestos fibers are bonded or combined with other materials. In these cases, the evolution of dust during installation would be minimal. Also, removal could be accomplished in such a manner that the dust hazard would be minimized.
10. To further minimize the hazards associated with the use of asbestos, the following actions are being considered:
 - a. Prohibit the use of asbestos for new construction and repair.
 - b. Investigate alternatives for vertical runs and abrasion resistant lagging.
 - c. Include in Chapter 9390 "Thermal Insulation" of NAVSHIPS Technical Manual, precautionary measures to be observed in the handling and use of asbestos with emphasis on "rip out" operations.
 - d. Insure that appropriate written documentation is made available and is utilized by the shipyards.

Copy to:
SHIPS 072
SEC 6100

SEC 6101B, 6101E, 6105, 6153

W. R. Riblett
W. R. RIBLEIT

BUMED Analysis of Hazard

The U. S. Navy is well aware of the hazards of asbestos to its employees engaged in ship construction and ship repair at naval shipyards. Hazard control measures implemented by the shipyard medical departments and safety divisions are in accordance with accepted standards of industrial hygiene practices in the U. S. Stringent efforts are directed at keeping the concentration of airborne asbestos dust below the level recommended by the American Conference of Governmental Industrial Hygienists. An energetic periodic physical examination program of shipyard workers is aimed at insuring the health of workers engaged in the asbestos trades.

For more than two years, the Naval Ship Systems Command and the Commander, Boston Naval Shipyard have been cooperating with a prominent investigator in a study whose ultimate goal is to optimize safe working conditions with respect to airborne asbestos. Upon the development of further scientifically founded recommendations for the control of this hazard, NAVSHIPS in cooperation with BUMED will take the necessary steps to implement them at the naval shipyards and other naval activities.

Enclosure (1) to Ser 6101C-1105

List of Packing and Gasket Specifications

MH-P-31	Packing Material, Asbestos, Metallic Cloth and Tape
MH-P-41	Packing, Asbestos, Rope and Wick
MH-G-76	Gaskets, Asbestos, Metallic Cloth
MH-P-34	Packing, Asbestos, Rod, Braided
MIL-P-2911	Type II, Packing Assembly, Hydraulic Conical and V Types
MIL-A-7021	Asbestos Sheet, Compressed for Fuel, Lubricant, Coolant, Water and High Temperature Resistant Gaskets
MIL-G-16265	Gaskets, Metallic Asbestos, Spiral Wound
MIL-P-16685	Packing, Rounded, Bulk and Proformed
MIL-P-17303	Packing Materials, Plastic Metallic and Plastic Nonmetallic
MIL-P-17349	Packing Material, Rod, High Pressure, Asbestos
MIL-P-17350	Packing Material, Semi-Metallic, Symbol 1400
MIL-A-17472	Asbestos Sheet, Compressed (Gasket Material)
MIL-G-21032	Gaskets, Metallic-Asbestos, Spiral Wound

Enclosure (2)

Use of Asbestos for Piping and Machinery Insulation

The naval shipyards have been aware of the hazards associated with the use of asbestos for many years and have to a great degree eliminated its use.

This is especially true with regard to asbestos felt materials which are considered the worst offenders with regard to propagation of air borne dust particles of the magnitude which can reach the lungs and cause asbestosis or mesothelioma. In 1964, NAVSEC advised shipbuilding and repair facilities that fibrous glass felt MIL-I-16411, Type II could be used at two-thirds the thickness required for asbestos felt. This recognition of the superior insulating characteristics of glass felt resulted in approximately equal material cost, thus eliminating the only advantage of asbestos. The response to this announcement was enthusiastic. A copy of the advising letter is attached hereto.

MIL-I-2781, Classes C and F Performed Fibrous Pipe Covering contains asbestos fiber bonded with diatomaceous earth. The danger in the use of this material results from sawing to form mitered joints or shorter than three-foot sections. Classes D and E of this specification are calcium silicate and are equal in insulating value. It is considered feasible to discontinue use of the fibrous type without downgrading our insulation practices.

The other asbestos form in common use is cloth. However, a recent development with regard to this item practically eliminates dust propagation. About a year ago as the result of a NAVSHIPYDPHILA Value Engineering Project, "rewettable asbestos cloth" was approved for Navy use. In this product, an adhesive is applied at the manufacturer's plant. The user merely soaks this cloth in water and applies it to the insulation. All asbestos fibers are bonded together by the adhesive and dust release is negligible.

Enclosure (4) to Ser 61010-1105

Exhibit 22



DEPARTMENT OF THE NAVY
NAVAL SHIP SYSTEMS COMMAND
WASHINGTON, D.C. 20360

IN REPLY REFER TO
NAVSHIPSINST 5100.26
07D:JC:1b
Ser 70-07D
9 February 1971

NAVSHIPS INSTRUCTION 5100.26

From: Commander, Naval Ship Systems Command

Subj: Asbestos Exposure Hazards; control of

Ref: (a) MIL-STD 769C of 15 Nov 1969, Thermal Insulating Requirements for Machinery and Piping
(b) NAVSHIPS Technical Manual 9390 of Sep 1967
(c) NAVMAT P-5100 "Safety Precautions for Shore Activities"
(d) NAVMAT P-10470 "Safety Equipment Manual"

Encl: ✓(1) Suggested Warning Signs

1. Purpose. To prescribe appropriate safety precautions during the use of asbestos.

2. Background.

a. Asbestos is a broad term applied to a group of fibrous minerals such as amosite, chrysotile, crocidolite, etc., composed of silicates of iron, sodium, calcium and/or magnesium.

b. The most critical use of asbestos in the Navy from a safety viewpoint is in the fabrication, installation, repair or removal of pipe and boiler insulation materials. Some workers sustain accidental contacts either while employed in various capacities where asbestos products are processed or when working in plant areas in which an environmental pollution of the air exists due to asbestos. The severe effects of asbestos on the lungs is the main factor for considering the elimination of asbestos as an insulation material on piping, ducts and boilers. References (a) and (b) set standards of materials which are to be used. These references will be reviewed periodically and changed as necessary to reflect the use of new materials that meet or exceed the standards now in use. Reference (c) also provides guidance on precautions regarding asbestos.

3. Action. The following safety precautions will be observed by all supervisors and workers engaged in the fabrication, installation and/or removal (rip-out) of asbestos-containing insulation/material. The provisions of this instruction will be effective as of this date. The provisions of this instruction are considered as minimum health and safety requirements; more stringent restrictions may be applied by local Commanders.

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Buffalo Pumps

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the initial Fabrication:

(1) Asbestos operations should be segregated from other operations so as not to expose other personnel to asbestos dusts. If the work cannot be separated, personnel in immediately adjacent areas will wear a Bureau of Mines approved respirator for irritant dusts and other prescribed, personal, protective equipment. The various items of personal, protective equipment will be those approved by the Industrial Hygienist, the Medical Officer, or as authorized by reference (d).

(2) The handling and fabrication areas will be restricted to the necessary workers, supervisors and inspection personnel directly concerned with the asbestos operations. Casual visitors or passers-by will be restricted from entry into any area where asbestos containing materials are being fabricated. All supervisors, workers, inspectors, etc., will wear approved respirators for irritant dusts when they are working with dry material containing asbestos or are in asbestos-contaminated areas of work spaces.

(3) Asbestos cloth cutting tables or benches provided with adequate local exhaust ventilation should be used whenever cutting operations are performed. Exhaust air containing asbestos dust will not be dispersed into the atmosphere without being adequately filtered. Filters will be carefully changed or cleaned to prevent atmospheric contamination.

(4) Power saws will be located in a suitable enclosure which is equipped with exhaust ventilation to a filter trap. This exhaust ventilation will be independent of the shop ventilation supply/exhaust system. The switches will be interlocked so that the exhaust system operates at all times while the saw blades are in operation.

(5) Suitable waste containers lined with disposable plastic bags will be provided at each cutting table/fabrication operation. Discarded and scrap asbestos materials will be immediately placed in plastic bags which are then sealed for disposal. Scrap should be disposed of on a daily basis.

(6) The Industrial Hygienist or Medical Officer will recommend the exact method and place of disposal of asbestos dusts and scrap to minimize exposures.

(7) Shop walls, ceilings and floors should be designed to prevent dust accumulations and to facilitate housekeeping measures.

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(8) Industrial type vacuum cleaners should be used to pick up dusts and scrap. The vacuum cleaner operator will wear an approved respirator when operating his cleaner. The water impaction collection system vacuums best and safely. Dry sweeping of scrap or dust should not be permitted. If sweeping is necessary, the scrap and possible dust will be wet down with a fine water spray prior to sweeping. Drop cloths will be placed under work tables or areas if scraps and dust will fall into difficult to clean areas or crevices.

(9) Asbestos cloth or tape will not be torn or ripped. Scissors or cutting knives will be used.

(10) In-Shop operations for mixing of all cements will be provided with permanent exhaust ventilation equipment. This exhaust air will not be vented into the shop atmosphere and must be adequately filtered before its release to the outside atmosphere. In-bag mixing may be done without exhaust ventilation so long as bag integrity is maintained.

(11) The asbestos cloth shall be wet down prior to fabrication.

(12) All regularly assigned insulation workers and supervisors will be given a 14" x 17" annual chest X-ray. This will be done on the same continuing, periodic basis even if the worker is transferred or reassigned into another job title. X-ray films of asbestos workers, active, reassigned or retired, will be specially identified to the consulting radiologist to alert him to the need for a special type of reporting. The health records of insulation workers will be marked "Asbestos worker".

(13) Insulation workers should be provided with clean coveralls at the beginning of each shift or as often as needed. The coveralls will be removed before the removal of the respirator and should not be "beaten" to remove excess dusts or scrap adhering to it. Contaminated coveralls will be placed in plastic bags, until disposed of or laundered.

(14) Materials will be removed from their cartons or package with care to reduce dust or scrap generation. Wetting of the material prior to removal substantially reduces dust production.

(15) The Industrial Hygienist will provide at least twice yearly indoctrination talks to all asbestos workers on the proper measures of personal protection against asbestos exposure.

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19 February 1971

(16) Adequate warning signs (enclosure (1) or similar) will be posted at all entrances to the fabrication shop sites to alert workers and other personnel that asbestos operations are in progress.

(17) The Industrial Hygienist should make frequent inspection of the Fabrication and Installation sites to check the level of airborne contamination. These inspections should be done monthly or more often as required. The Threshold Limit Value (TLV) for airborne asbestos is 5 fibers greater than 5 microns per milliliter. If this TLV is exceeded, the Industrial Hygienist will assist the shop foreman in designing better preventive measures to control the airborne contamination. Asbestos installation, fabrication or removal operations should be suspended until the proper TLV can be maintained so as to protect the workers and others in the area.

(18) Cement bags will be opened wide to permit emptying of the contents without shaking. The material should be made into a slurry as quickly as possible to prevent dust generation. Empty bags will be wet down and placed in a waste container.

(19) Suitable replacement materials for asbestos will be used when practicable. New or untested replacement materials will be submitted to NAVSEC for evaluation and approval prior to use.

b. Installation:

(1) Personnel engaged in Installation operations will wear Industrial Hygienist approved respirators whenever asbestos containing materials are being handled. The Medical Officer will be the approval authority for any exceptions.

(2) Unpacking and application of insulation materials at the installation site will be done in such a manner that will minimize airborne dust.

(3) The area around the installation procedures should be isolated when possible. Adequate warning signs (enclosure (1)) will be posted. Only persons whose work requires their presence should be permitted in such areas. If airborne asbestos dust is present, they will wear Bureau of Mines approved respirators for dusts or leave the area.

(4) The Industrial Hygienist will be requested to determine suitable methods for preventing large scale contamination of machinery and engine spaces when installation or removal operations are performed in these areas.

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(5) Suitable waste containers lined with disposable plastic bags will be kept available at the installation site so that discarded or scrap insulation materials can be immediately placed in them.

(6) The exact method and place of disposal of scrap asbestos and asbestos dust will be approved by the Industrial Hygienist or the Medical Officer. Personnel assigned these tasks will be specifically advised on needed precautions by the Industrial Hygienist or the shop supervisor.

(7) The ventilation requirements of shipboard or confined spaces will be determined by the Industrial Hygienist or Safety Officer and will be in accord with Article 0212 1045-1054 of reference (c).

(8) Portable dust collectors/Industrial-type vacuum cleaners should be placed in use at the point of operations within confined spaces when possible.

(9) Decks and spaces contaminated by insulation debris will not be dry swept. These areas must be wet down by a fine spray prior to sweeping (when vacuum cleaners cannot be used).

(10) Workers performing insulation work should be provided with clean paper coveralls when dusty conditions are to be encountered. The coveralls will be removed before the respirator is removed. The coveralls should not be "beaten" to remove excess dusts or scraps adhering to it. Contaminated coveralls will be disposed of by placement in the asbestos scrap bag.

c. Removal (Rip-Out):

(1) Personnel engaged in Removal operations will wear Bureau of Mines approved respirators whenever asbestos containing materials are being handled. The Medical Officer will be the approval authority for any exceptions.

(2) The area around the Removal procedures should be isolated when possible. Adequate warning signs (enclosure (1)) will be posted. Only persons whose work requires their presence will be permitted in such areas. If airborne asbestos dust is present, they will wear Bureau of Mines approved respirators for irritant dusts or leave the area.

(3) The Industrial Hygienist/Medical Officer should designate specific procedures to collect scrap and dust in the machinery spaces.

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(4) The area(s) in which asbestos removal takes place will be confined when possible by means of curtains, portable partitions, drop cloths, etc., to prevent excessive contamination of other areas.

(5) In removal operations that involve dusty work, clean paper coveralls will be supplied at the start of each shift; then for lunch, the workers will dispose of the dirty coveralls, then dispose of their respirator filters. After lunch they will put on clean coveralls and respirators with new filters. At the end of the shift all contaminated coveralls will be disposed of by placement in the asbestos scrap bags.

(6) Suitable waste containers lined with disposable plastic bags will be kept available at the removal site so that discarded or scrap insulation materials can be immediately placed in them.

(7) The exact method and place of disposal of scrap asbestos and asbestos dust will be approved by the Industrial Hygienist/Medical Officer. This is particularly applicable on-board ships and in machinery spaces.

(8) High asbestos-containing scrap material should be wet down before collection, hauling or dumping. Personnel assigned these tasks will be specifically advised on needed precautions by the Industrial Hygienist or the insulation shop supervisor.

(9) The ventilation requirements of shipboard or confined spaces will be determined by the Industrial Hygienist or Safety Officer and will be in accord with articles 0212, 1045-1054 of reference (c).

(10) Portable dust collectors/industrial-type vacuum cleaners should be placed in use at the point of operations within confined spaces. They may be used to temporarily and partially clean a worker who has to leave the work area for a short time.

(11) Decks and spaces contaminated by insulation debris should not be dry swept. These areas must be wet down by a fine spray prior to sweeping (when vacuum cleaners cannot be used).

(12) A cast cutter similar to the Number 845 STRYKER CUTTER will be used when possible during removal operations. This is a cutter used by doctors to remove plaster casts from patients. Old insulation should not be ripped or torn. It should be cut whenever possible. The addition of a vacuum attachment to the STRYKER CUTTER will materially aid in controlling dust generation. This attachment should be used whenever practicable.

NAVSHIPSINST 5100.26
9 February 1971

(13) The Industrial Hygienist will periodically evaluate the level of asbestos exposure and recommend positive measures for dust control in various areas. This evaluation should be done at the start of each new asbestos operation and as often thereafter as the findings indicate to provide effective control over dust producing operations.

(14) The use of off-hours work should be considered to minimize the number of personnel susceptible to exposure of irritant dusts.

d. Approved Safety Materials/Clothing:

(1) The Industrial Hygienist will recommend and approve the various types of respirators, overalls and other needed personal protective equipment to be used by personnel engaged in various asbestos operations. Only personal protective equipment approved in accordance with Federal Specification GGG-M-125, Type III, Classes 1 and 2 as set forth in reference (d) will be used.

(2) Each worker will be responsible for maintaining his respirator and filters in a satisfactory condition. He will wear it in a proper manner when working on dust producing operations and during all asbestos removal operations.

(3) Supervisors will enforce the proper use of personal protective equipment during all phases of asbestos work. They will arrange for prompt, scheduled physical examinations and X-rays as prescribed by the Medical Officer (normally annually).

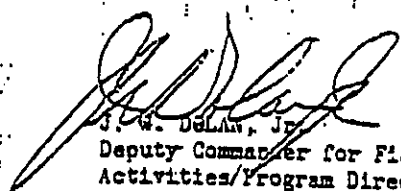
(4) Supervisors will arrange for an adequate supply of clean coveralls and new filters for the respirators used by insulation workers.

e. Application of Substitute Materials For Asbestos:

(1) Any proposed materials for use in place of asbestos will be submitted to NAVSEC for evaluation and approval prior to use.

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J. W. DeLay, Jr.
Deputy Commander for Field
Activities/Program Director for
Shipyard Modernization and Management

NAVSHIPSINST 5100.26

9 February 1971

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L. Braidinger, 2/1/71

NAVSHIPSINST 5100.26
9 February 1971

1. This document
contains information
relating to the
operation of the
ship's engine room.

2. The information
contained herein is
classified as follows:

SUGGESTED WARNING SIGNS

1. In the event
of a fire in the
engine room, the
personnel should
immediately evacuate
the area and report
the fire to the
ship's command.

2. When the
engine room is
operating, the
personnel should
wear protective
clothing.

**RESTRICTED ACCESS
ASBESTOS FABRICATION AREA**

1. This area is
restricted access
due to the presence
of asbestos.

**RESTRICTED ACCESS
ASBESTOS INSTALLATION/RIE OUT
WEARING OF RESPIRATORS REQUIRED**

Exhibit 23

Case 1:11-cv-00406-LEK -RLP Document 8-20 Filed 06/30/11 Page 1 of 45 PageID
#: 630

UNIFORM LABELING PROGRAM- NAVY
9/24/56

WK Navy 5106

DEPARTMENT OF THE NAVY
Office of the Secretary
Washington 25, D. C.

3760.8
SECNAV 6220.3-
QUAD-7231-107
24 September 1956

SECNAV INSTRUCTION 6220.3-1

From: Secretary of the Navy
To: Chief of Naval Material
Chief of Naval Operations
Chief of Naval Personnel
Chief of Naval Research
Chief, Bureau of Aeronautics
Chief, Bureau of Medicine and Surgery
Chief, Bureau of Ordnance
Chief, Bureau of Ships
Chief, Bureau of Supplies and Accounts
Chief, Bureau of Yards and Docks
Commandant, U. S. Marine Corps
Commander, U. S. Navy Air Transportation Service

Subj: Uniform labeling program for hazardous industrial chemicals and materials.

Encl: (1) Markings and Design of Labels
(2) Tentative Label Classification Guide
(3) Elements of a Labeling Program

1. Purpose. The purpose of this instruction is to standardize on labeling requirements for hazardous chemical products during the usage stage, and to provide selective labels which will contain pertinent information designed to warn against the potential dangers involved.

2. Scope. This instruction applies to the labeling of all hazardous materials throughout the Naval Establishment wherever distribution of hazardous chemicals and materials is made to the actual consumer (shop, office, or unit). It applies to materials received from any supply source, provided the material is intended for ultimate use at the local activity. In this regard it refers to labeling of the original container as well as any other container to which the material may subsequently be transferred. This instruction is not intended to govern:

a. The type of labels to be affixed by the manufacturer. (These are governed by State and Federal laws and regulations depending on the nature of the material and whether its shipment is interstate or intrastate. In addition, most major manufacturers of chemicals abide by the "Warning Labels Guide" published by the Manufacturing Chemists' Association.)

SECRET
24 September 1936

OFFICE OF THE SECRETARY

b. The type of labels to be affixed to containers of chemicals or drugs used, or dispensed, by medical department pharmacies.

c. Those chemicals used by clinical or chemical laboratories, where small quantities of the chemicals are to be used as reagents by trained personnel who are familiar with the potential hazards involved. (The exempted laboratories will be those designated by the various bureaus, offices, and Marine Corps.)

d. The labeling of explosives, gasoline, and fuels, and compressed gases. (These are adequately covered by current instructions.)

3. **Background.** The rapid development of new chemical products and the introduction of new chemical processes make it mandatory that precautionary measures be taken during the handling of toxic and dangerous chemicals. Warning labels affixed to containers of hazardous chemicals are one of the most practical means of accomplishing this objective. This instruction is based on a composite of the procedures recommended by the Manufacturing Chemists' Association, the International Labor Organization, the American Conference of Governmental Industrial Hygienists, the Atomic Energy Commission, and the labeling programs presently in effect at the Naval Gun Factory, the Alameda Naval Air Station, and the Mare Island Naval Shipyard.

4. **Action**

a. **Naval Department Standardization Office.** The Navy Department Standardization Office shall effect the assignment of a limited coordination military (Navy) project in connection with this instruction to standardize the printed labels in respect to quality of paper, size, color, shape, insignia, wording, and design; quality of the glue; specifications for inks (including colors of inks); and other related matters. Enclosure (1) summarizes the markings and designs for labels agreed upon by representatives of the bureaus and offices.

b. **Bureau of Supplies and Accounts.** The Bureau of Supplies and Accounts shall initiate procedures to have the necessary labels stocked as General Stores items for use by all naval activities.

c. **The Technical Bureaus.** The classification of hazardous chemicals and materials shall be accomplished through the joint efforts of the technical bureaus in that each Bureau shall be responsible for passing on these aspects, of any single item, which fall within its technical purview.

OFFICE OF THE SECRETARY

5780-2
SECNAVINST 6000.7
24 September 1956

4. Safety Precautions Board. The Safety Precautions Board shall:

(1) Publish in Safety Precautions (OPNAV 14-P1) a "Label Classification Guide" listing the classification of hazardous chemicals and materials currently in use as determined by the appropriate technical bureau or office.

(2) Review the "Label Classification Guide" in accordance with information recurringly provided by the responsible technical bureaus and offices relative to the use of new chemicals and proprietary materials, deletions, and changes in classifications.

c. Bureaus, Offices, and Marine Corps. The bureaus, offices, and Marine Corps, shall initiate implementing instructions for use by activities under their management control upon completion of action required by paragraphs 4a, 4b, 4c, and 4d(1), above. Enclosure (3) is an outline of the "Elements of a Labeling Program" for guidance.

P. A. Fogle
P. A. FOGLE
Commander, Bureau of the Navy, Medical

Enclosure (1)

5700.8
SERVANT 686073
24 September 1956

Markings and Dimensions of Labels

Class	Background	Color of letters	Shape of insert	Insulation
I. Fire hazard	Blue	Red	Pentagon	Flame
II. Toxic and fire hazard	Orange	Black	Square	Flame and skull
III. Toxic	Grey (dirty white)	Orange	Circle	Skull
IV. Poisonous	White	Red	Hexagon	Skull and crossbones
V. Corrosive	White	Black	Diamond	Hand
VI. Radiation hazard	Yellow	Purple	Square	Large 3-bladed propeller

All labels shall be of two sizes that is, 2 1/2 inches square and 4 inches square.

Enclosure (1)

Enclosure (2)

SECNAVIST 54609
24 September 1956

Tentative Label Classification Guide
August 1956

1. This label classification guide is to be used with the labeling procedure for hazardous chemicals and materials. It indicates the proper labels to be affixed on hazardous items in Federal Supply Classification Groups 34, 42, 59, 65, 67, 68, 75, 79, 80, and 93 with miscellaneous H, E, and Z organic items.

2. This guide is composed of the following sections:

(a) INDEX: Listed in Federal Stock Number sequence with cross reference to former Navy Stock Number, page where listed, and applicable label assigned.

(b) ALPHABETIC LISTING:

(c) APPENDIX: Listed in former Navy Stock Number sequence with cross reference to Federal Stock Number, page where listed, and applicable label assigned. The appendix is furnished as an additional conversation aid.

Enclosure (2)

57029

RECEIVED
September 1996

PSN No.	Former No.	Page	Label
0 3432-255-1574	051-P-475	17	III
-1575	-677	17	III
-1576	-680	17	III
0 4210-213-3856	-358	17	III
-3857	-353	17	III
-3858	-356	17	III
-3859	-356	17	III
0 4210-213-1510	051-C-1015-20	15/17	III
0 5150-118-5826	051-C-1530-75	15/17	III
-5827	-1535	17/14	III
-5828	-1540	17/14	III
-5829	-1545	17/14	III
-5830	051-A-97-300	11	III
-5831	-400	11	III
-5832	-400	11	III
0 5150-118-9176	051-C-1538	11/14	III
0 5150-118-7222	051-C-1535-1500	11	III
-7223	-4500	11	III
0 5970-161-1232	052-P-1300	21	III
0 5970-166-1575	-1190	26	III
-1576	-1195	26	III
-1577	-1195	26	III
-1578	-1195	26	III
-1579	-1240	26	III
-1580	-1255	27	III
-1581	-1260	27	III
-1582	-1260	27	III
-1583	-1305	27	III
-1584	-1345	27	III
-1585	-1350	27	III
-1586	-1345	27	III
-1587	-1360-10	27	III
0 5970-166-1692	052-P-1360-30	24	III
-1693	-1361-20	24	III
-1694	-1361-30	24	III
-1695	-1361-50	24	III
-1696	-1361-50	24	III
-1697	-1361-50	24	III
-1698	-1361-50	24	III
0 5970-295-7111	051-C-660-1060	15	III
0 5970-110-9987	051-S-3457-150	25	III
0 6505-274-6732	051-P-751-200	17	III
0 6505-299-3102	051-S-3595	25	III
-3103	051-P-730	17	III
-3104	051-P-2131-100	22	III
-3105	051-P-1104	22	III
0 6750-174-5455	051-A-2607	11	III
0 6810-146-1520	-1551	11	III
0 6810-174-1807	051-S-3334-985	26/25	III
-1808	051-P-10052	21	III
-1809	051-A-282	21	III
-1810	-311	19	III
-1811	051-A-713-20	11	III
-1812	-2880-100	13	III
-1813	051-C-110-75	13	III
-1814	051-S-2000	26/25	III
-1815	-3215	25	III
0 6010-104-1784	051-T-5751	26	III
-1785	051-A-219	11	III
-1786	-220	11	III
-1787	051-C-775	13	III
-1788	051-P-5758	26	III
-1789	051-C-705	13	III
0 6810-191-3964	051-A-1975	11	III
0 6810-222-3773		11	III

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5-200-8
 22 MAY 1957
 22 September 1956

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	0 6810-238-2374	051-A-2345	12	I
	-2643	-2396	12	V
	-9645	-950	11	V
	-9660	-940-100	11	V
	-9661	-940-110	11	V
	-9655	-1145	11	IV
	0 6810-233-2121	051-C-767	13	III
	-2735	051-A-235	11	I
	0 6810-227-1843	051-S-2080	24	V
	-1851	051-A-115-1	28	III
	0 6810-230-3926	051-A-2390	12	V
	-3935	051-A-240	13	I
	-3936	-245	13	I
	-3937	-246	13	I
	-3938	-247	13	I
	-3953	051-P-2247	22	V
	-3953	-1240	22	V
	0 6810-213-1726	051-S-2056-50	24	V
	-1725	-100	24	V
	0 6810-236-5665	051-A-940-180	11	V
	-5666	-946	11	V
	-5667	-1003-25	11	V
	-5670	-1154	11	V
	-5671	-1007	11	V
	-5672	-2347	12	V
	-5677	051-B-234-50	13	III
	-5678	051-C-512	11	III
	-5681	-1971	15	IV
	-5683	051-A-1154-50	11	IV
	-5689	051-B-364	19	III
	W 6810-238-7702		19	I
	0 6810-238-8115	051-C-152	13	IV
	0 6810-242-2116	051-S-2363	25/26	V
	-2119	051-S-3021-500	25	III
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	0 6810-242-4768	051-A-335-10	19	I
	0 6810-243-1436	051-S-1050	24	IV
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	-1637		19	II
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	W 6810-246-6472		13	IV
	0 6810-247-4310	052-P-11692	22	III
	-4311	-11700	22	III
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	0 6810-249-8038	051-T-4495	26	V
	0 6810-251-7977	051-S-3299-50	25	IV
	-7978	-3298	25	IV
	-8007	051-A-1584	11	IV
	-8008	-1567	11	IV
	0 6810-255-0471	051-C-448	13	IV
	-0472	-451-10	13	IV
	-0474	051-A-326	19	IV
	-0476	-329-60	19	IV

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5700.8
SERIALIZED 43663
24 September 1956

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0 6810-281-2666	051-4-1128-15	25	IIIcP
	052-4-85	25	II
	-75	25	II
	-75-50	25	II
W 6810-281-2763	051-4-2750	13	IV
0 6810-281-2765	052-4-293	23	II
0 6810-281-2793	052-4-125	13	II
0 6810-281-2794	051-4-280-125	24	I
	-3220	12	V
	-3576	24	II
	-3577	24	II
	-4247	24	II
	-6928	19	IV
	051-4-150	12	II
	052-4-180	26	V
	-6939	26	V
	-6960	26	V
	-7469	12	IIIcP
	-7678	26	III
	-9579	26	II
	-9827	22	V
0 6810-282-9703	051-4-1813-25	17	IV
	052-4-875	26	III
	052-4-15-50	26	II
	051-4-183	22	V
0 6810-282-9703	051-4-176-500	27	IV
	051-2-435	28	IV
0 6810-285-1322	052-4-5000	21	III
	052-4-1105	19	III
	-1323	12	I
	-4442	19	III
	-3436	19	III
	-3450	19	III
	051-4-424-50	19	III
	-44-130	19	III
0 6810-290-0017	051-4-360-25	13/22	V
	051-4-832	19	III
	-860	19	III
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	051-4-1299-15	25	III
	051-4-1557-15	25	III
	-3836	25	III

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0 6810-264-1937	051-4-1235	11	IV
	051-4-716-900	11	IV
	-950	11	IV
	051-4-1148-100	14	III
	051-4-3023-577	25	III
	051-4-1766	22	III
	051-4-1290	11	V
	-1559	11	IV
	-1560	11	IV
	-1561	11	IV
	-1562-7	11	IV
	051-4-1459-70	24/25	V
	051-4-2001-20	19	III
	051-4-120	19	III
	051-4-115	19	III
	051-4-4459-300	26	III
	051-4-384-300	20/25	V
	-385	20/25	V
	051-4-377-5	21	V
	051-4-875-50	13	III
	-876	12	III
	051-4-778-50	26	III
	-779	26	III
	051-4-3243-500	25	V
	-3243	25	V
	052-4-424-360	18/24	IV
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	-427	23	I
	051-4-3080	24	I
	-3083	25	IV

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0 6810-281-4212	051-2-3139	24/25	IV
0 6810-285-2447	051-1-157-295	18	III
0 6810-285-4315	-155-1235	18	IV
0 6810-285-4315	-171-135	18	IV
0 6810-285-4315	051-2-585	24	IV
0 6810-285-4315	-7091	25	I
0 6810-285-4315	-8018	25	I
0 6810-285-4315	-8019	25	I
0 6810-285-4315	-8020	25	I
0 6810-285-4315	051-1-127	27	V
0 6810-285-4315	-100	27	V
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0 6810-285-4315	051-1-128-257	27	V
0 6810-285-4315	-550	27	V
0 6810-285-4315	051-2-1497-9	27	V
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0 6810-285-4315	-10	27	V
0 6810-285-4315	-14	27	V
0 6810-285-4315	051-2-1446	27	V
0 6810-285-4315	052-2-3856-177	27	V
0 6810-285-4315	051-2-760-135	27	V
0 6810-285-4315	051-2-1113-242	27	V
0 6810-285-4315	-1552-15	27	V
0 6810-285-4315	051-2-1595	27	V
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21 September 1956

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0 6810-281-4212	051-2-1745	22	IV
0 6810-285-2447	051-2-1128-10	25	III
0 6810-285-4315	052-1-1100-13	27	II
0 6810-285-4315	-100	27	II
0 6810-285-4315	-400	27	II
0 6810-285-4315	051-2-1763	27	II
0 6810-285-4315	052-2-850	27	II
0 6810-285-4315	-460	27	II
0 6810-285-4315	051-1-127	27	I
0 6810-285-4315	-157-500	27	I
0 6810-285-4315	-167-137	27	I
0 6810-285-4315	051-2-3170	27	III
0 6810-285-4315	051-1-157-400	27	III
0 6810-285-4315	-5	27	III
0 6810-285-4315	-354-35	27	III
0 6810-285-4315	051-2-359-10	27	III
0 6810-285-4315	051-1-155-315	27	III
0 6810-285-4315	-361-133	27	III
0 6810-285-4315	-351-410	27	III
0 6810-285-4315	051-2-590	27	III
0 6810-285-4315	051-2-110	27	III
0 6810-285-4315	051-2-1446	27	III
0 6810-285-4315	051-2-157-75	27	III
0 6810-285-4315	-167-165	27	III
0 6810-285-4315	-157-165	27	III
0 6810-285-4315	051-1-155-355	27	III
0 6810-285-4315	-171	27	III
0 6810-285-4315	-165	27	III
0 6810-285-4315	051-2-14819-200	27	III

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September 1976

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-1730	25	I	-1730	25	I
052-8-2362	27	I	052-8-2362	27	I
-1732	27	I	-1732	27	I
052-8-415	27	III	052-8-415	27	III
-1761	27	I	-1761	27	I
052-8-1900	27	I	052-8-1900	27	I
-2175-10	27	I	-2175-10	27	I
-2160	27	II	-2160	27	II
-2200	27	I	-2200	27	I
052-8-511	27	I	052-8-511	27	I
-55	27	II	-55	27	II
-560	27	II	-560	27	II
052-1-1200	27	III	052-1-1200	27	III
-513-55	27	II	-513-55	27	II
-512	27	II	-512	27	II
-55	27	II	-55	27	II
052-1-145	27	II	052-1-145	27	II
-587-5	27	II	-587-5	27	II
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-1005-255	27	II	-1005-255	27	II
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-989	27	II	-989	27	II
-984-315	27	II	-984-315	27	II
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052-8-2362	27	I	052-8-2362	27	I
-1732	27	I	-1732	27	I
052-8-415	27	III	052-8-415	27	III
-1761	27	I	-1761	27	I
052-8-1900	27	I	052-8-1900	27	I
-2175-10	27	I	-2175-10	27	I
-2160	27	II	-2160	27	II
-2200	27	I	-2200	27	I
052-8-511	27	I	052-8-511	27	I
-55	27	II	-55	27	II
-560	27	II	-560	27	II
052-1-1200	27	III	052-1-1200	27	III
-513-55	27	II	-513-55	27	II
-512	27	II	-512	27	II
-55	27	II	-55	27	II
052-1-145	27	II	052-1-145	27	II
-587-5	27	II	-587-5	27	II
052-8-2375	27	I	052-8-2375	27	I
052-1-945	27	II	052-1-945	27	II
-978-30	27	II	-978-30	27	II
-1005-255	27	II	-1005-255	27	II
-976-171	27	II	-976-171	27	II
-957-55	27	II	-957-55	27	II
-969	27	II	-969	27	II
-989	27	II	-989	27	II
-984-315	27	II	-984-315	27	II
-984-310	27	II	-984-310	27	II
-976-265	27	II	-976-265	27	II
-954-260	27	II	-954-260	27	II
-978-40	27	II	-978-40	27	II

Enclosure (2)

Index

FSM No.	Former No.	Page	Label
0 8010-165-6136	052-L-976-85	18	II
-6137	-982-60	18	II
-6139	-978-255	19	II
-6140	-982	19	II
-6141	-5	19	II
-6557	052-P-20635-2	23	II
-6558	-20621	23	II
-6560	-20670	23	II
-6561	-50	23	II
-6566	-5247	23	II
-6568	-30524-160	23	II
-6569	-5175	23	I
-6570	-5177	23	I
-6573	-20646-100	23	II
-6574	-180	23	II
0 8010-166-1659	052-N-1660	27	II
-1671	-2859-975	27	I
-1676	-2862	27	II
-1688	052-L-1800	18	II
-1689	-435	18	II
-1703	-948-750	18	II
0 8010-169-7082	052-P-20660	23	II
-7083	-30665	23	II
-7086	052-L-779-23	23	II
0 8010-171-1504	-951	19	II
0 8010-221-1504	052-P-12732	22	III
-1507	-11342	22	III
-1656	-11117	22	III
-1658	052-C-1650	25	III
0 8010-234-5176	052-P-1679-950	27	II
W 8010-242-2046		26	II
FSM No.	Former No.	Page	Label
0 8010-243-0963	052-P-515	16	I
0 8010-244-0702	052-P-11150	22	III
-5791	-5944	23	II
-5792	-5945	23	II
-5793	-6530	23	I
-5794	-6540	23	I
W 8010-246-6113		26	II
-6116		26	II
0 8010-246-6115	052-P-995	26	II
0 8010-247-4296	052-P-1000	26	III
-4309	052-P-11290	22	III
-4314	-12030	22	III
-4318	-12650	22	III
-4321	-13820	22	III
-4326	-14120	22	III
-4335	-16760-15	22	II
-4351	-17990-25	22	II
-4352	-100	22	II
-4799	-12920	22	III
-6712	-13675	22	III
-6713	-10100	22	III
-6719	-11135	22	III
0 8010-251-4980	052-P-1680-50	27	II
0 8010-257-5383	052-L-962-45	19	II
0 8010-262-2172	052-N-2100	16	I
0 8010-281-1104	052-P-950	26	II
-7119	052-P-20408-1010	23	II
0 8010-282-2621	-9176	21	None
0 8010-283-0396	-5150	20	II
-0508	-11310	22	III
0 8010-285-4668	052-P-9175	21	None

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FSM No.	Former No.	Page	Label
0 8010-286-7721	052-P-7977	21	None
-7722	-7975	21	None
-7830	052-E-1254-2115	16	II
-7831	052-P-3240	21	II
-7832	052-E-1256-2120	16	II
-7833	-1254-2015	16	II
-7834	052-P-3772-150	21	II
-7835	-175	21	II
-7840	052-E-1264-2030	16	II
-7841	-2120	16	II
-8190	052-P-5217-115	20	II
-8491	-1926	20	II
-8492	-15	20	II
-9081	052-E-3752-2015	16	II
-9082	052-P-5270-365	20	II
-9089	052-E-1253-2110	16	II
-9090	-1254-2020	16	II
-9091	052-P-3765	21	II
0 8010-290-0373	-20646-6500	23	II
-0374	-8700	23	II
-1160	052-P-7975	26	II
-2858	052-P-5270-98	70	II
-2859	-98	20	II
-2868	052-E-1266-2110	16	II
-2869	-2110	16	II
-2870	-3258-2010	16	II
-2871	-3262-2015	16	II
-2872	-2115	16	II
-2873	-3260-2005	16	II
-2874	-2105	16	II
-2875	052-P-3500	21	II

FSM No.	Former No.	Page	Label
0 8010-285-1872	052-P-7815	21	II
-1873	-7850	21	II
-1893	-5270-94	21	II
-1894	-78	21	II
-1898	-7925	21	II
-1899	-7930	21	II
-7015	-5270-48	21	II
-7016	-50	21	II
-7016	-70	21	II
-7018	-85	21	II
-7601	-6550	20	II
-7295	052-E-3252-2005	16	II
-5320	-3250-2010	16	II
-9121	-2110	16	II
0 8010-286-0518	052-P-9180	21	None
-0519	-9175-5	21	None
-0550	-9182	21	None
-0591	-9176-100	21	None
-0592	-105	21	None
-0593	-300	21	None
-0594	-9177-500	21	None
-0595	-9178	21	None
-0596	-9176-205	21	None
-0597	-9184-100	21	None
-0598	-9177-505	21	None
-0599	-9178-100	21	None
-2860	052-P-370	21	III
-2861	-20	21	III
-3177	052-P-6325	20	II
-3843	-4940	20	II
-3944	-4955	20	II

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Index	FSN No.	Former No.	Page	Label	Form No.	Page	Label
	0 8010-290-7875	052-P-3505	23	II	052-O-2100	14	III
	-3752	052-P-442	24	II	052-P-20405	23	II
	-3753	-111-425	24	II	-20619-150	23	III
	-3869	052-P-3108	21	None	052-L-1160	14	II
	-4069	-4505	23	II	052-E-2270-10	15	II
	-4060	-4507	20	II	-50	15	II
	-4267	-178-5100	20	II	-57506-55	15	I
	-6158	052-L-348-785	16	II	-3577-100	14	I
	-6159	052-C-2218-120	14	II	-3577	14	I
	-6613	052-P-4516-950	23	II	052-C-3556-165	15	I
	-6614	-955	20	II	052-C-1128	15	III
	-6615	-5224-500	21	II	-3084-25	15	I
	-6616	-5350	20	II	052-P-20730	23	III
	-6617	052-L-4011-155	16	II	-20760	23	III
	-6618	-240	16	II	-20730	23	III
	-6652	052-P-179-510	17	II	-21050	23	I
	-6665	052-C-1770	20	II			
	-6698	052-P-177-80	20	II			
	0 8010-291-1050	-3809-2510	20	III			
	-1061	-2515	20	III			
	-1062	-1286-210	20	II			
	-1063	-240	20	II			
	-1064	-410	20	II			
	-1065	-420	20	II			
	-1066	-610	20	II			
	-1068	-1210	20	II			
	-1069	-1220	20	II			
	-5267	-6581	20	II			
	0 8010-292-1127	-556	20	II			
	0 8010-299-0214	-20540	23	II	052-C-3094-125	15	I
		052-P-310	26	I			

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FD No.	Form No.	Page	Label
W 8030-255-1150		15	III
W 8030-255-1151		15	III
W 8030-255-1152		15	IV
W 8030-255-1153		22	II
W 8030-255-1154		14	II
W 8030-255-1155		14	II
W 8030-255-1156		14	IV
W 8030-255-1157		14	V
W 8030-255-1158		14	V
W 8030-255-1159		14	VI
W 8030-255-1160		14	VI
W 8030-255-1161		14	VI
W 8030-255-1162		14	VI
W 8030-255-1163		14	VI
W 8030-255-1164		14	VI
W 8030-255-1165		14	VI
W 8030-255-1166		14	VI
W 8030-255-1167		14	VI
W 8030-255-1168		14	VI
W 8030-255-1169		14	VI
W 8030-255-1170		14	VI
W 8030-255-1171		14	VI
W 8030-255-1172		14	VI
W 8030-255-1173		14	VI
W 8030-255-1174		14	VI
W 8030-255-1175		14	VI
W 8030-255-1176		14	VI
W 8030-255-1177		14	VI
W 8030-255-1178		14	VI
W 8030-255-1179		14	VI
W 8030-255-1180		14	VI
W 8030-255-1181		14	VI
W 8030-255-1182		14	VI
W 8030-255-1183		14	VI
W 8030-255-1184		14	VI
W 8030-255-1185		14	VI
W 8030-255-1186		14	VI
W 8030-255-1187		14	VI
W 8030-255-1188		14	VI
W 8030-255-1189		14	VI
W 8030-255-1190		14	VI
W 8030-255-1191		14	VI
W 8030-255-1192		14	VI
W 8030-255-1193		14	VI
W 8030-255-1194		14	VI
W 8030-255-1195		14	VI
W 8030-255-1196		14	VI
W 8030-255-1197		14	VI
W 8030-255-1198		14	VI
W 8030-255-1199		14	VI
W 8030-255-1200		14	VI
W 8030-255-1201		14	VI
W 8030-255-1202		14	VI
W 8030-255-1203		14	VI
W 8030-255-1204		14	VI
W 8030-255-1205		14	VI
W 8030-255-1206		14	VI
W 8030-255-1207		14	VI
W 8030-255-1208		14	VI
W 8030-255-1209		14	VI
W 8030-255-1210		14	VI
W 8030-255-1211		14	VI
W 8030-255-1212		14	VI
W 8030-255-1213		14	VI
W 8030-255-1214		14	VI
W 8030-255-1215		14	VI
W 8030-255-1216		14	VI
W 8030-255-1217		14	VI
W 8030-255-1218		14	VI
W 8030-255-1219		14	VI
W 8030-255-1220		14	VI
W 8030-255-1221		14	VI
W 8030-255-1222		14	VI
W 8030-255-1223		14	VI
W 8030-255-1224		14	VI
W 8030-255-1225		14	VI
W 8030-255-1226		14	VI
W 8030-255-1227		14	VI
W 8030-255-1228		14	VI
W 8030-255-1229		14	VI
W 8030-255-1230		14	VI
W 8030-255-1231		14	VI
W 8030-255-1232		14	VI
W 8030-255-1233		14	VI
W 8030-255-1234		14	VI
W 8030-255-1235		14	VI
W 8030-255-1236		14	VI
W 8030-255-1237		14	VI
W 8030-255-1238		14	VI
W 8030-255-1239		14	VI
W 8030-255-1240		14	VI
W 8030-255-1241		14	VI
W 8030-255-1242		14	VI
W 8030-255-1243		14	VI

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SECRET
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Description	Stock No.	Label
ABRASIVE		
Polishing Compound	G 5350-184-5826	IXI
	-5827	IXI
	-5828	IXI
	-5829	IXI
Vapor blast	-191-9776	IXI
	-124-6256	IXI
	-6257	IXI
	-6258	IXI
ACETONE		
Technical	G 6810-184-4795	I
	-4796	I
	-223-2735	I
ACID		
Acetic, glacial, technical	G 6810-275-1215	V
Chromic (Chromium Trioxide Technical)	-174-1218	IXV
	-354-3733	IXV
	-3739	IXV
Hydrochloric, Technical (Muratic)	-222-9645	V
	-7660	V
	-9661	V
	-236-5665	V
	-5666	V
Hydrofluoric, Technical	-5671	V
Nitric, Technical	-222-9655	IXV
	-236-5670	IXV
	-5683	IXV
Oxalic, Dihydrate, technical	-364-5937	IV
Phosphoric, Ortho, technical	-236-5667	V
	-364-6722	V
Sulfuric, technical	-114-7520	IXV
	-351-8007	IXV
	-8008	IXV
	-364-6723	IXV
	-6724	IXV
	-6725	IXV
	-6726	IXV
	-290-3836	IXV

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5150.8
EXHIBIT 68647
24 September 1956

Description	Stock No.	Label
ADHESIVE		
Assembly gluing of laminates	O 6060-373-8701	III
	-8702	III
	-285-1571	III
Buoyancy Material	-373-8718	II
Cotton Brattice Cloth	-266-7126	I
Diving Outfit	-7130	IIIV
Duck, Leather, Buna-N and Plastic	-273-8697	II
Fibrous Glass Installation	-3706	I
	-8707	I
	-8708	I
	-8709	I
	-8710	I
	-8711	I
Mastic floor covering to cement	-266-7125	I
Newspaper Covered Cloth	-290-7123	II
Photographers and Artists	-266-7129	IIIV
Rubber Emergency Repair	-7127	IIIV
Synthetic		
Rubber to Rubber	-7131	III
Rubber to Steel	-273-8716	II
	-J727	II
ALUMINUM solution	O 6810-281-7169	IIIV
ALCOHOL		
n-Butyl technical	-6928	II
Denatured	-222-2373	I
	-2374	I
Ethyl, technical	-285-2142	I
	-290-3110	I
Methanol, technical (Methyl)	-275-6010	IIIV
	-6011	IIIV
AMMONIUM		
Dichromate		
Photographic	O 6750-274-5169	IIIV
Phosphoric acid	O 6850-222-9698	V
Hydroxide		
Aqua Ammonia	O 6818-222-9643	V
	-230-3926	V
	-236-5672	V
Technical		
Lithographic	-281-3080	V

5100.8
SECNAVINST 6860.9
24 September 1956

Description	Stock No.	Label
AMMONIUM (Cont.)		
Reagent.....	G 6810-243-1436	V
Nitrate Technical	Z 51-4-2390	V
	G 6810-174-1819	I
ASPHALTUM lithographic	G 6850-281-2793	II
-B-		
BARIUM HYDROXIDE OCTAHYDRATE technical	G 6810-236-5677	III
BENZENE technical (Benzol)	W 6810-226-6272	IAIV
	-281-2764	IAIV
-C-		
CALCIUM		
Carbide technical	G 6810-230-3935	I
	-3936	I
	-3937	I
	-330-3938	I
Hydroxide technical	-174-1820	V
Hypochlorite technical	-238-8715	IAV
	-255-0471	IAV
	-0472	IAV
Phosphide, technical	-236-5678	II
CARBON		
Dioxide Absorption Fluid	G 6810-285-7026	V
Dioxide Absorption Shells	G 6850-390-8101	V
Tetrachloride, technical	G 6810-184-1799	III
	-191-3944	III
	-223-2723	III
	-281-8003	III
CURRENT		
Electronic equipment	N52-C-1110	II
Film	G 6840-354-5841	II
Leather Belt	-381-2723	I
Liquid		
Form "A" gasket	N52-C-684-955	II
Gasket	-685-52	II
	-825	II
General purpose	-41-900	II
Rubber gasket	-1112-675	II
Plastikon	-1553-90	I

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#: 6485100.8
SENAVINST 6260-9
24 September 1956

Description	Stock No.	Label
AMMONIUM (Cont.)		
Reagent	G 6810-213-1436	V
Nitrate Technical	2 51-a-2190 G 6810-174-1819	V I
ASPHALTUM lithographic	G 6850-281-2793	II
-B-		
BARIUM HYDROXIDE OCTAHYDRATE technical	G 6810-236-5677	III
BEDOLITE technical (Densel)	W 6810-216-6172 -281-2764	IV IV
-C-		
CALCIUM		
Carbide technical	G 6810-230-3935 -3936 -3937 -230-3935 -174-1020	I I I I V
Hydroxide technical	-230-8135	IV
Hypochlorite technical	-255-0471 -0472	IV IV
Phosphide, technical	-236-5678	II
CARBON		
Dioxide Absorption Fluid	G 6810-285-7086	V
Dioxide Absorption Shells	G 6850-290-3101	V
Tetrachloride, technical	G 6810-184-4799 -191-1964 -223-2723 -281-2003	III III III III
CEMENT		
Electronic equipment	NS2-C-1110	II
Film	G 8040-356-5841	II
Leather Belt	-281-2723	I
Liquid		
Form "A" gasket	NS2-C-684-955	II
Gasket	-685-52 -325	II II
General purpose	-61-508	II
Rubber gasket	-1142-675	II
Plastikon	-1553-90	I

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Enclosure (2)

5100 4
SECRET 6440-3
24 September 1956

Description	Stock No.	Label
CHARGES Fire Extinguisher	G 4210-223-5882 -229-1510	III V
CHLOROFORM	G 6810-261-6707	III
CHROME CASE	G 5350-193-7222 -7225	III III
CLEANERS		
Electrolytic Metal	G 6850-285-4311	V
Instrument-Match Solution	-270-8258	I
Mile Sore Liquid	-285-4311	V
Scouring, Powder	G 7930-129-0807	V
Silicate-Soap Metal	G 6850-269-9817	V
Toilet Bowl Type	G 7930-267-4929 G 7510-219-8017	V III
COATINGS		
Bituminous Emulsion for Ballast Tanks	G 8030-261-5711 -281-4277	III III
Metal	-275-2121 -8122	V V
Waterproof. for Wood	-286-3976	II
Plastic		
Acrylic, Protective	G 8010-290-6159	II
Spray type, Strippable	G 8030-166-2808 -275-8093 -8094	II II II
Sealer, Underbody	-286-3975 -221-1833 -1834	II I I
COMPOUND		
Abrasive polishing	G 5350-184-5826 -5827 -5828 -5829 -191-9776	III III III III III
Antifreeze	G 6850-285-4757	III
Saksan glassin (Grease substitute)	-271-5120	I
Boiler, Liquid	-290-3863	II
Carbon removing	-281-3042 -3043 -3044 -286-7106 -290-3861	III III III III III

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Case 1:11-cv-00406-LEK -RLP Document 8-20 Filed 06/30/11 Page 24 of 45 PageID
#: 6505/06-8
SECRETARY 6260-J
24 September 1956

Description	Stock No.	Label
CLAYPOUND (Cont.)		
Caulking		
Wooden Hull seams	G 6030-241-3761	I
Metal enclosures	-238-2768	III
Corrosion Preventative	-351-5069	I
Non Oxidizing	W 8030-251-1150	III
	-1151	III
Thin film,		
Hard film	-114-1299	II
	-1300	II
	-1302	II
Soft film	-1295	II
	-1297	II
	-1298	II
Water displacing soft film	-1293	II
	-1294	II
	-1296	II
Corrosion Removing	G 6850-275-1219	V
Cyanide, Heat treating	G 6850-216-3760	IV
	-3761	IV
Glyptal	W52-C-3097-25	II
Insulating, Electrical	G 5970-295-7111	V
Preservation		
Hard film	W 8030-221-9578	I
Soft film	-231-2347	I
	-244-1504	I
Preservative		
Canvas	G 8030-281-2347	II
Cotton Cloth	-2720	II
	-2721	II
Rust Arresting Temporary	-231-2344	I
	-171-3242	I
Sandblast Antirust Powder	G 6850-281-6942	III
Sealing		
Aerosol-type plastic	G 8030-261-3837	II
Linoleum seams	-367-5054	III
Polymer-Powder	-281-4502	III
Oil stop	-3818	III
Oil and water stop	-3817	III
Smoothing Cement	G 8010-227-1698	I
Vapor barrier	G 6030-174-2588	II
	-2589	II
CUPROUS CYANIDE TECHNICAL	G 6810-236-5681	IV

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#: 6515160-8
SENAVINGST 660053
24 September 1956

Description	Stock No.	Label
BAKERS		
Cobalt Naphthenate	G 8010-165-4780	II
	-4781	II
Lead and Manganese	-4782	II
Lead and Manganese	-4792	II
	-4793	II
Manganese Linoleate	-4786	II
Manganese Naphthenate	-4788	II
DUPLEXING FLUID (Direct Process)	B 7510-272-9800	II

MAGNET

Note: All Samples will bear Label No. I
except those in the following categories:

Chlorinated Rubber-based	G 8010-285-8395	II
	-9328	II
	-9321	II
	-286-7830	II
	-7832	II
	-7833	II
	-7840	II
	-7841	II
	-9081	II
	-9089	II
	-9090	II
	-390-2868	II
	-2869	II
	-2870	II
	-2871	II
	-2872	II
	-2873	II
	-2874	II
Semigloss for drums and vials		
Black	-6617	II
Olive-drab	-6618	II

FILLER WOOD

Paste	G 8010-243-0963	I
Plastic	-262-9172	I

Enclosure (2)

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Alphabetic Listing

5701.8
SUCRAY JUST 640-3
24 September 1956

Description	Stock No.	Label
FILTER AIDS (Diatomaceous Silica)		
Chemically treated	G 9390-290-5089	III
Untreated	-254-0918	III
FIRE EXTINGUISHER CHARGES		
Anti-Freeze	G 4210-223-9082	III
Liquid	-9086	III
	-9067	III
	-9673	III
Soda Acid	-209-1540	V
FLUX WELDED		
Aluminum and Aluminum Alloy	G 3432-255-4576	III
	-4575	III
	-4576	III
FORMALDEHYDE SOLUTION NP		
Paint Ingredient	G 6810-291-8391	IV
	-8392	IV
Photographic	G 6505-276-6732	IV
	-299-1415	IV
	-G-	
GOLD SIZE (Varnish)	G 8010-290-6665	II
	-H-	
HYDROGEN PEROXIDE		
Technical (30%)	G 6810-282-9703	14V
	-I-	
INDICATORS		
Corrosion Control	G 6820-243-8513	I
INHIBITOR, PICKLING CHEMICAL		
Passive liquid	G 6850-255-0438	V
Non-passive liquid	-0440	V
INSECTICIDES		
Chloroform		
Concentrate	G 6810-270-8262	II
Solution (2%)	-352-0530	II
DDT		
Dusting Powder		
Deaerating	G 6850-274-5415	III

Alphabetic Listing

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Enclosure (2)

5100-5
SICMAVIST 6260-5
24 September 1956

Description	Stock No.	Label
INSECTICIDES (Cont.)		
Insect	G 6810-210-2510	III
Emulsion Concentrate	-252-3002	III
and Lindane	-216-4432	III
Powder	-285-4307	IV
Concentrate	-212-4221	III
Water Dispersible (75% DDT)	-4222	III
Solution	-261-6692	III
Airplane spray and fog	-281-1462	III
Shore use only	-171-1610	II
Spray	-281-1990	III
	-285-2117	III
Dieldrin	-261-9043	IIIV
Lead Arsenate	-285-4315	IV
Lime Sulfate	-227-1254	III
Lindane	-252-3000	IIIV
Sodium Sulfate Solution	-261-6693	IV
Sodium Arsenate Solution	-261-2073	IV
Sodium Fluoride	-210-2127	IV
LACQUERS		
Smoking		
Battery Deck Canvas Covers	G 6010-165-4763	II
Copper and Brass	-166-1628	II
	-1639	II
Spraying		
Acid Resisting	-1700	II
General Purpose	-290-6154	II
Clear	-165-6111	II
Pigmented	-6113	II
	-6116	II
	-6121	II
	-6123	II
	-6124	II
	-6126	II
	-6127	II
	-6128	II
	-6130	II
	-6132	II
	-6135	II
	-6136	II
	-6137	II

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Enclosure (2)

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Alphabetic Listing

5700.8

SUNAVIST 666.1
24 September 1956

Description	Stock No.	Label
LACQUER (Cont.)	G 6010-165-6139	II
Pigmented (Cont.)	-6140	II
	-6141	II
	-169-7088	II
	-171-1504	II
	-357-5363	II
LAUNDRY SOUP	G 7930-252-0509	IV
LEAD ACETATE	G 6810-285-1323	III
LIME CHLORINATED	-212-4768	IAN
	-255-0474	IAN
	-0476	IAN
	-281-4217	IAN
MERCURY	G 6810-285-3434	III
	-3450	III
	-290-0017	III
	-0018	III
	H 51-M-827	III
NAPHTHA		
Aromatic, Petroleum	V 6810-241-7637	II
	-7638	IV
	-7639	III
Coal tar	-1207	III
	-1208	III
	-1209	III
	-1210	III
	-1211	III
Petroleum Precipitation	-238-7702	I
NAPHTHALENE	G 6810-270-6218	III
	-264-9061	III
NICKEL		
Ammonium Sulfate	G 6810-174-1804	III
Chloride	-1815	III
Sulfate	-236-5469	III

5700.8
SUNAVDIST 6860.3
24 September 1956

<u>Description</u>	<u>Stock No.</u>	<u>Label</u>
LACQUER (Cont.)		
Pigmented (Cont.)	G 8010-165-6139	II
	-6140	II
	-6141	II
	-169-7088	II
	-171-1504	II
	-357-5183	II
LAUNDRY SOUP	G 7930-853-0509	IV
LEAD ACETATE	G 6810-885-1323	III
LIME CHLORINATED	-282-4768	IAV
	-255-0474	IAV
	-0476	IAV
	-281-4247	IAV
MERCURE	G 6810-285-3434	III
	-3450	III
	-290-0017	III
	-0018	III
	H 51-A-827	III
NAFTHA		
Aromatic, Petroleum	W 6810-244-7637	II
	-7638	IV
	-7639	III
Coal tar	-1207	II
	-1208	II
	-1209	II
	-1210	II
	-1211	II
Petroleum Precipitation	-238-7702	I
NAFTHALENE	G 6810-270-6218	III
	-264-9001	III
NICKEL		
Ammonium Sulfate	G 6810-174-1814	III
Chloride	-1815	III
Sulfate	-234-5669	III

5/10.8
SCHAFFERT 1000-3
24 September 1956
Description

Description	Stock No.	Label
WATER CASE	C 6610-270-998 -9985	V V
OFFSET MASTER SOLUTION	C 6850-285-800	V

PAINT

NOTE: All Paints will bear Label No. I
except those in the following categories:

Anti-fouling	C 8010-290-569	II
Cold plastic	-291-5266	II
	-5267	II
Hot plastic shipbottom	-287-7501	II
Natural Rubber	-266-1177	II
Vinyl	-290-6267	II
	-6552	II
	-6566	II
Anti-cumant Fire-Retardant		
Exterior		
Alkyd, Hospital Ship	-283-0396	II
Alkyd, Naval Shipboard Use	-215-3278	II
Full Gloss, General Purpose	-290-4049	II
	-4050	II
	-6643	II
	-6646	II
Shore Use, Exterior	-272-1060	III
	-1061	III
Full Gloss, Shore Use	-286-8190	II
Phenolic, Submarine use	-3943	II
	-3944	II
Rubber, Solvent type	-291-1062	II
	-1063	II
	-1064	II
	-1065	II
	-1066	II
	-1068	II
	-1069	II
Semi-gloss, Shore use	-286-8191	II
	-8192	II
Vinyl-alkyd, Shipboard use	-290-2578	II
	-2579	II
	-286-9062	II

Enclosure (2)

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Alphabetic Listing

3700
SHEPARDIST 680073
24 September 1956

<u>Description</u>	<u>Stock No.</u>	<u>Label</u>
PAINT (Cont.)		
Vinyl-Alkyd, Submarine use	G 8010-385-7013	II
	-7014	II
	-7016	II
	-7019	II
	-1893	II
	-1894	II
Interior, fire-retardant	-286-7811	II
	-7814	II
	-7835	II
	-8091	II
	-290-2875	II
	-2876	II
Stripping	-285-1872	II
	-1896	II
	-1899	II
	-1873	II
Zinc dust	-290-6616	II

Note: The following paints require no labeling of any kind:

Water Base	G 8010-283-2621	Not Req'd
Paste	-285-1668	Not Req'd
	-286-0588	Not Req'd
	-0589	Not Req'd
	-0590	Not Req'd
	-0591	Not Req'd
	-0592	Not Req'd
	-0593	Not Req'd
	-0594	Not Req'd
	-0595	Not Req'd
	-0596	Not Req'd
	-0597	Not Req'd
	-0598	Not Req'd
	-0599	Not Req'd
Portland Cement	-286-7721	Not Req'd
	-7722	Not Req'd
White pigment	-290-3869	Not Req'd
PANAFORMALDEHYDE PLANK	G 6810-285-1322	III
FORMICA, THEORETICAL (Carbolic Acid)	G 6810-171-1612	IV
	-2813	IV

Alphabetic Listing

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Enclosure (3)

Case 1:11-cv-00406-LEK-RJP Document 8-20 Filed 06/30/11 Page 22 of 45 PageID
#: 6583700-4
SENAVIXST 64407
24 September 1956

Description	Stock No.	Label
PHOTOGRAPHIC CHEMICALS		
Deep Etch Lacquer Solution	G 6850-275-5988	II
Deep Etch Shellac Solution	-281-3779	I
Plate Etch Solution	-4162	V
Zinc Plate Deep Etch Solution	-2026	V
PIGMENT		
Antimony, Oxide Dry	G 8010-247-8713	III
Chrome Green Dry	-283-0508	III
	-247-8719	III
Chrome Green Paste	-4335	II
Chrome Orange Dry	-227-1507	III
Chrome Yellow (Medium) Dry	-246-0702	III
Chromium Oxide Dry	-247-4309	III
Diatomaceous Silica Dry	-8709	III
Litharge Dry	G 6810-247-4310	III
	-4311	III
	-4313	III
Mercuric Oxide, Dry	G 1010-247-4314	IV
Red Lead Grade A Dry	-4318	III
Red Lead Grade C Dry	-227-1504	III
White Lead Basic Carbonate Paste	-247-4351	II
	-4352	II
White Lead Basic Carbonate Dry	-2712	III
Zinc Chromate Insoluble Dry	-227-1696	III
Zinc Dust Dry	-247-4321	III
Zinc Yellow (regular) dry	-247-4324	III
POTASSIUM		
Cyanide ACS	G 6810-290-3841	IV
Dichromate Technical		
Metal Pickling	-291-0637	IIIAV
Photographic	-264-6717	IIIAV
Ferricyanide Photographic	G 6750-176-5455	IV
Hydroxide		
Lithium Solution (Electrolyte)	G 6850-274-5202	V
Solution (CO ₂ Absorption)	G 6610-285-7006	V
Technical (Caustic Potash)	-230-3951	V
	-3553	V
	-281-9827	V
Permanganate 1.5P	G 6505-297-1428	I
PRESERVATION-SOLUTION CONCENTRATE		
Sonar Sea Chest	G 6030-264-1124	IV

Enclosure (2)

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Alphabetic Listing

5/100.8
 SECRETARY 4240.3
 24 September 1956

Description	Stock No.	Label
PRIMER		
Alloy-Resin Steel	G 8010-165-8558	II
Anti-corrosive Shipbottom	-214-5791	I
	-5794	I
Asphalt	G 8030-165-8559	II
Dark Green Metal	G 8010-165-7082	II
	-7083	II
Exterior Wood	-165-8546	II
Interior Wall Primer-Sealer	-8569	I
	-8570	I
Lacquer-Resisting Synthetic	-272-1127	II
Maintenance Exterior	-165-8573	II
	-8574	II
	-281-7399	II
Pretreatment Coating for Metals	G 8010-165-8577	IIAV
Red Lead - Linseed Oil	G 8110-214-5791	II
	-5792	II
Synthetic Metal and Wood	-161-5713	II
	-7125	II
Undercoat for Wood Decks	-165-8548	II
Vinyl, Red Lead	-290-0373	II
Vinyl, Zinc Chromate	-0374	II
Zinc, Chromate	-161-7419	II
	-165-8557	II
Zinc, Dust-Zinc Oxide	-8560	II
	-8561	II
PUTTY	G 8030-213-0952	III
	-0953	III
	-0954	I
	-0954	III
STAINING TECHNICAL	G 6810-281-2765	II
	-2-	
REMOVER		
Fingerprint	W 8030-252-8300	I
	-8301	I
Paint and Varnish	G 8010-164-5300	III
	-165-1447	III
	-286-2860	III
	-2861	III
RESIN		
Solutions	G 6810-281-2036	I
	-2037	I

Alphabetic Listing

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Enclosure (2)

5700'S
RECEIVED-4360.3
24 September 1956

-T-

Description	Stock No.	Label
TAR, COAL	G 6810-281-4939 -4940	V V
TETRACHLORETHANE	G 6810-244-9015	IV
TETRACHLORETHYLENE	G 6810-270-9982	III
TETRACHLORIDE PHOSPHATE	G 6810-219-8038	V
THINNER	252-T-543-9980	II
Bipentane	G 6810-281-9579	II
Dope and Lacquer	G 8010-160-5787	II
	G 8010-160-5792	II
Paint, Mineral Spirits	W 8010-242-2086 -216-6113 -6114	II II II
Stripable Plastic Coating Compound	-165-5585	II
Synthetic Resin Enamel	W 8010-160-5794 -5795 -165-5583	II II II
	G 8010-165-5584	II
TOLUENE (TOLUOL)	W 6810-281-2005 -2006	II II
TRICHLORETHYLENE	G 6810-264-4774 -4800	III III
TRICHLORIDE PHOSPHATE	G 6810-281-7478	III
TRICHLORIDE PHOSPHATE	G 6810-210-2116	
TURPENTINE	G 8010-216-8145 -281-4108 -290-1140	II II II

-T-

VARNISH		
Asphalt	G 8010-160-5856 -399-0214	I I
Electrical Insulating General Purpose	G 5970-166-1675 -1676 -1677 -1678	I I I I

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Enclosure (2)

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Alphabetic listing

5100.7
SUMMARY 1956
24 September 1956

Description	Stock No.	Label
VANISH (Cont.)		
Electrical Insulating		
General Purpose (Cont.)	6 5970-166-1679	I
	-1680	I
	-1681	I
	-1682	I
	-1683	I
	-1684	I
	-1690	I
High Temperature	161-7232	I
	166-1691	I
	-1696	I
Interior	6 8010-161-7124	I
	-165-1424	I
	-1430	I
Paneling		
General Purpose	-166-1659	II
	-234-5176	II
	-251-6980	II
Motorboat	-166-1673	I
	-1674	I
Shells cut		
Blackwood	-145-1761	I
	-1762	I
Orange	-161-7278	I
	-165-1765	I
	-6073	I
Spur Glacresins	-160-5332	I
	-165-1432	I

-4-
WATER TREATMENT COMPOUND6 6850-250-2626
-56277
7

WOOD PRESERVATIVE COMPOUNDS

6 8030-281-2717
-2721
-2718L.V
II
IIA-1-
XYLENE (XILOL)6 6810-290-1145
-1146
-1167IX
II
II

Alphabetic Listing

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Enclosure (2)

Case 1:11-cv-00406-LEK-RLP Document 8-20 Filed 06/30/11 Page 33 of 45 PageID
#: 662

5100.5
 SIKHAYIKST 4240-3
 24 September 1954

<u>Description</u>	<u>Stock No.</u>	<u>Label</u>
ICM		
Granide	0 680-282-970	IV
East	0 680-282-1051	III
Phosphate	0 680-282-1266	III

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Alphabetical Listing

Appendix				Appendix				JENAVDUST-22513 21 September 1956			
Former No.	FSN No.	Page	Label	Former No.	FSN No.	Page	Label				
061-A-97-500	Q 6550-184-0288	11	III	061-A-1013-26	Q 6550-281-7449	12	III				
-400	-0237	11	III	-1836	Q 6510-222-2373	12	I				
-800	-0269	11	III	-1946	-2374	12	I				
-95-1280	Q 6550-290-0101	13	V	-1946	-266-2463	12	I				
-219	Q 6510-184-0395	11	I	-1972	-290-1040	12	I				
-210	-0298	11	I	-2387-640	-243-4036	13	V				
-228	-223-2736	11	I	-2380	-230-3818	12	V				
-387-8	-276-1216	11	V	261-A-2380	Q 6510-222-9443	12	V				
-710-940	-284-3936	11	IAV	061-A-2386	-246-4072	12	V				
-840	-289	11	IAV	-2397	Q 6750-274-8168	12	V				
-732-80	-174-1030	11	IAV	-2607	Q 6510-281-9050	12	V				
-636	-234-3404	11	V	-2440-128	-174-1018	13	I				
-840-100	-222-2440	11	V	-2440-100	-234-3377	13	III				
-110	-2463	11	V	061-A-239-80	-236-3088	13	I				
-120	-254-5608	11	V	061-A-260	-3898	13	I				
-860	-282-0646	11	V	-284	-3898	13	I				
-1037	-238-8871	11	V	-285	-3898	13	I				
-1146	-282-9645	11	IAV	-890	-3897	13	I				
-1184	-238-5470	11	IAV	-416	Q 6510-284-0484	24	IV				
-50	-5483	11	IAV	-440-76	Q 6510-174-1420	13	V				
-1238	-246-3957	11	IV	-448	-258-0471	13	IAV				
-1298	-0723	11	V	-453	-254-0118	13	IAV				
-1303-26	-236-1667	11	V	-484-10	-258-0472	13	IAV				
-1535	-144-7880	11	IAV	-833	-234-6678	13	III				
-1657-16	-280-3838	11	IAV	-787	-223-2723	13	III				
-1659	-264-0723	11	IAV	-776	-184-4780	13	III				
-1680	-264-0723	11	IAV	-776-60	-281-2008	13	III				
-1681-7	-0726	11	IAV	-788	-191-3864	13	III				
-1587	-0784	11	IAV	-1035-20	Q 6510-223-8862	14/17	III				
-1884	-281-6008	11	IAV	-1038-75	-289-1860	14/17	V				
	-6007	11	IAV	-1148-100	Q 6510-284-0707	16	III				

SENAVIDIST 688817			
24 September 1956			
Former No.	PSN No.	Page	Label
681-C-1313-243	0 6850-288-4314	14	V
-1328	0 7910-248-8017	14	III
-1328	0 8350-191-9778	11/14	III
-1630	-184-8824	11/14	III
-1636	-8827	11/14	III
-1640	-8828	11/14	III
-1946	-8829	11/14	III
-1946-16	0 8450-246-4757	14	III
-1957-40	-281-3043	14	III
-1667-44	-3044	14	III
-48	-3042	14	III
-88	-286-7308	14	III
-88	-280-3881	14	III
-1668-140	-289-9817	14	V
-1679-30	0 7850-287-9829	14	V
-486	0 6850-290-3663	14	III
-1670	0 6810-248-3760	14	III
-1676	-3761	14	III
-1686-84	0 6850-276-3485	14	III
-1596-1600	0 8350-193-7228	14	III
-2800	-7228	14	III
-1608-1824	0 6850-278-1219	14	V
-1616-886	0 7950-128-0408	14	V
-1671	0 6810-254-8641	14	III
-D-837	0 7610-272-9800	14	III
-F-360-803	0 8350-190-8089	17	III
-361	-244-0818	17	III
-366	0 7910-223-9868	17	III
-355	-9867	17	III
-366	-9873	17	III
-366-28	0 6810-286-7089	13/28	V
Former No.	PSN No.	Page	Label
681-P-476	0 3451-283-4576	17	III
-477	-4576	17	III
-840	-4576	17	III
-730	0 6801-289-1618	17	III
-753-200	-274-8732	17	III
-760-135	0 6850-282-9898	12	V
-B-174-620	0 6810-282-9703	17	III
-I-127	0 6820-243-8613	17	I
-137	0 6860-256-0438	17	V
-140	-0440	17	V
-166-366	0 6840-270-8362	17	III
-376	-253-0450	17	III
-1228	-388-4307	18	III
-164-86	0 6820-246-8432	18	III
-187-6	0 6840-248-4221	18	III
-25	-4222	18	III
-76	-264-4482	18	III
-338	-281-8482	18	III
-808	-246-2447	18	III
-500	-176-1810	18	III
-600	-240-2460	18	III
-210	-252-3502	18	III
-1626	-266-9043	18	III
-126	-291-1880	18	III
-187-133	-264-3000	18	III
-157	-227-1264	18	III
-166	-246-8893	18	III
-171	-276-8816	17	III
-156	-286-4316	18	III
-1-326	0 6810-283-0474	19	III
-329	-281-4347	19	III

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Appendix

SEATTLE
21 September 1956

Former No.	FSN No.	Page	Label	Former No.	FSN No.	Page	Label
651-S-1050	Q 4810-243-4154	24	IV	651-S-1050	Q 4810-243-4154	24	IV
-1730	Q 7830-331-2996	24	V	-1730	Q 7830-331-2996	24	V
-1732	-2000	24	V	-1732	-2000	24	V
-1734	-2000	24	V	-1734	-2000	24	V
-1900	Q 4810-243-4156	24/25	V	-1900	Q 4810-243-4156	24/25	V
-2000	-174-4581	24/25	V	-2000	-174-4581	24/25	V
-2001-20	-244-8028	24/25	V	-2001-20	-244-8028	24/25	V
-2004-20	-233-1714	24	V	-2004-20	-233-1714	24	V
-100	-1715	24	V	-100	-1715	24	V
-2060	-227-1843	24	V	-2060	-227-1843	24	V
-2313	-241-5050	13/24	IV	-2313	-241-5050	13/24	IV
-3021-500	-240-2119	28	III	-3021-500	-240-2119	28	III
-577	-264-2714	28	III	-577	-264-2714	28	III
-3040	-281-3104	28	III	-3040	-281-3104	28	III
-3045	-280-4170	28	III	-3045	-280-4170	28	III
-3118-10	-281-2866	28	III	-3118-10	-281-2866	28	III
-16	Q 4840-240-2123	18/25	IV	-16	Q 4840-240-2123	18/25	IV
-3270	Q 4810-281-3050	28	V	-3270	Q 4810-281-3050	28	V
-3211-500	-174-3586	28	V	-3211-500	-174-3586	28	V
-2245	-381-7878	28	V	-2245	-381-7878	28	V
-3289	-280-3838	28	V	-3289	-280-3838	28	V
-19	-281-7977	28	V	-19	-281-7977	28	V
-60	-240-2121	25	V	-60	-240-2121	25	V
-3336	-174-1807	24/25	IV	-3336	-174-1807	24/25	IV
-3338-885	Q 4840-281-4243	24/25	IV	-3338-885	Q 4840-281-4243	24/25	IV
-3356	Q 4808-180-3987	28	I	-3356	Q 4808-180-3987	28	I
-3667-180	-248-1402	28	I	-3667-180	-248-1402	28	I
-3685	Q 4850-270-3288	14/25	V	-3685	Q 4850-270-3288	14/25	V
-4008-200	-281-1004	20	V	-4008-200	-281-1004	20	V
-4696	-281-3182	22	V	-4696	-281-3182	22	V
-4645				-4645			

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Former No.	FSM No.	Page	Label	Former No.	FSM No.	Page	Label
681-A-1603-80	G 6850-231-2770	22	I	652-C-720	G 8040-273-8706	12	I
-4740	G 7350-252-0508	19/25	IV	-725	-8707	12	I
-4450-900	G 4840-281-2068	26	IV	-726	-8708	12	I
-5840	-264-6006	24	IV	-727	-8709	12	I
-2-6469-70	G 6810-284-9016	26	IV	-728-280	-268-7424	12	I
-200	-270-8982	26	III	-746	-875-8710	12	I
-4405	-249-8038	26	V	-747	-8711	12	I
-3751	-164-4794	26	III	-1060	G 8030-269-8066	16	III
-5728	-8000	26	III	852-C-1110		13	III
-5238	-260-2118	25/26	V	-1162-678		13	III
-M-127	G 6850-250-2826	27	V	652-C-1235	G 8040-268-7428	12	IIIV
-1-148-1	-2827	27	V	-1296-76	-7427	12	IIIV
-435	G 6810-237-1851	28	III	-1894-100	-7430	12	IIIV
-388	-284-8704	28	IV	-1315	-7431	12	III
-480	G 6840-285-7091	24	IV	852-C-1853-80		13	I
	-250-1268	24/28	III	652-C-1545	G 8040-290-7113	12	II
				-1866-100	-873-8897	12	II
652-A-86-203	G 8040-273-8702	12	III	-750	-8736	12	II
-816	-286-1871	12	III	-755	-8737	12	II
-860	-273-8701	12	III	-1577	G 8030-221-1234	14	I
-160	G 6810-281-8928	12	II	-100	-1833	14	I
-293	G 6850-281-2783	13	II	-1850	G 8010-237-1898	16	I
G52-C-82-750	G 8040-268-7425	12	I	-1852-478	G 8040-273-8718	12	II
852-C-84-809		13	II	-1048-20	G 8030-278-8121	14	V
G52-C-800	G 8040-251-2723	12	I	-30	-8122	14	V
-800	-340-8041	13	II	-2100	-181-8714	14	III
-852-1040	G 6370-238-7131	13	V	-80	-243-4337	16	III
852-C-824-750		13	II	-2216-250	-244-3337	16	II
-828-82		13	II	-2218-120	G 8010-290-8189	16	II
-425		13	II	-2280-5	G 8030-278-8063	14	II

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Former No.	FSN No.	Page	Label
042-E-3248-2010	0 4010-290-2870	16	II
-2110	-286-3048	16	II
-3260-2005	-290-2875	16	II
-2105	-2876	16	II
-3262-2016	-2871	16	II
-2116	-2872	16	II
-3264-2020	-286-7840	16	II
-2120	-7841	16	II
-3264-2010	-390-2848	16	II
-2110	-2869	16	II
-4032-186	-4647	16	II
-210	-4648	16	II
-F-616	-293-0940	16	I
-860	0 4010-291-2191	17	IV
-860	-5392	17	IV
-860	-286-1122	21	III
-6000	0 4010-290-4456	21	II
-G-1770	0 4010-291-2182	25	II
-E-78	-2183	25	II
-60	-2181	25	II
-65	-2181	25	II
-L-120	0 4010-300-1648	16	II
-236	-1649	16	II
-410-760	-1700	16	II
-106	-286-2158	16	II
-991	-171-1504	19	II
-841-920	-106-2132	16	II
-847-45	-6128	16	II
-842-60	-6137	16	II
-48	-287-2363	19	II
-266	-168-2111	16	II
-878-80	-6135	16	II
-82	-8136	16	II

Former No.	FSN No.	Page	Label
042-G-2350-10	0 4030-275-8054	14	II
-2281	-246-3975	14	II
-2270-10	-174-2568	16	II
-60	-2569	16	II
-2280	-284-2574	16	II
-208-15	-241-2741	16	II
-3093-139	-201-2720	16	II
-138	-2721	16	II
-3094-126	-261-8089	16	I
042-G-3128-16	0 4030-234-2798	16	II
-3164	-281-3017	16	III
-3164	-2816	16	III
-3164-20	-2377	16	I
-3164-444	-231-2344	16	I
-3164-477	0 4030-231-6943	16	III
-67608-85	0 4030-274-3242	16	I
-811	0 4030-281-8578	28	II
-85	0 4010-168-4760	16	II
-812	-4761	16	II
-613-58	-4762	16	II
-440	-4763	16	II
-4764	-4764	16	II
-284-9320	-284-9320	16	II
-2321	-2321	16	II
-2008	-2321	16	II
-2018	-2321	16	II
-3264-2016	-7833	16	II
-2116	-7830	16	II
-3164-2020	-4090	16	II
-3120	-7832	16	II

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SIXTH AVENUE
24 September 1956

Former No.	FSM No.	Page	Label	Former No.	FSM No.	Page	Label
Q43-P-7860	Q 8010-245-4813	21	II	Q43-P-11720	Q 8010-247-4313	22	III
-7826	-4808	21	II	-12030	-4314	22	IV
-7830	-4809	21	II	-12650	-4316	22	III
-8340	-290-8845	20	II	-12732	-277-1504	22	III
-8355	-250-7722	21	None	-12920	-247-9709	22	III
-8887	-7721	21	None	-13476	-8712	22	III
-9108	-290-3809	21	None	-13820	-4321	22	III
-9175	-255-4608	21	None	-14117	-277-1694	22	III
-5	-288-6529	21	None	-14120	-247-4324	22	III
-9176	-282-2421	21	None	-16780-15	-4326	22	II
-100	-266-0511	21	None	-18980-26	-1331	22	II
-106	-0502	21	None	-100	-4337	22	II
-200	-0503	21	None	-20478	Q 8030-165-3559	23	II
-208	-0506	21	None	-20480	Q 8010-181-7415	23	II
-2177-800	-0504	21	None	-20483	-3718	23	II
-808	-0506	21	None	-20484-100	-105-3673	23	II
-8178	-0506	21	None	-110	-4674	23	II
-100	-0509	21	None	-1673	-201-7399	23	II
-8180	-0508	21	None	-20324-140	-165-3546	23	II
-8182	-0530	21	None	-20540	-282-1127	23	II
-8184-100	-0507	21	None	-20821	-305-3956	23	II
-8274-800	-290-8845	21	II	-21250-2	-161-419	23	II
-10032	-174-1813	21	IVAV	-20356-2	-153-4857	23	II
-35	-1815	21	IVAV	-20868-6400	-270-4373	23	II
-10100	-247-8713	22	III	-8700	-4374	23	II
-11260	-4509	22	III	-20548-160	Q 8030-165-3877	23	IVAV
-11310	-283-0809	22	III	-20860	Q 8010-182-7082	23	II
-11326	-247-8713	22	III	-20865	-7083	23	II
-11382	-227-1607	22	III	-20870	-168-5560	23	II
-11460	-244-0702	22	III	-50	-8541	23	II
-11880	Q 8010-247-4310	22	III	-23074-880	Q 8030-281-4802	23	III
-11700	-4311	22	III	-2071C	-243-0956	23	III

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Former No.	FSM No.	Page	Label	Former No.	FSM No.	Page	Label
003-T-20730	0 8010-180-5787	24	III	003-T-620	0 8010-165-5635	24	III
-20760	0 8010-231-7478	24	III	003-T-543-9800	0 8010-230-1180	24	III
-21060	-248-4445	24	III	003-T-507-5	-251-4104	24	III
-2-370	-259-0214	24	III	-478	-393-0214	24	III
-410	-180-5656	24	III	-815	-180-5656	24	III
-415	0 8970-168-1876	24	III	-925	-1100	24	III
-428	-1878	24	III	-960	-1105	24	III
-424	-1877	24	III	-T-310	-1166	24	III
-360	-1876	24	III	-315	-1160	24	III
-425	-1679	27	III	-1100	-1260	24	III
-424-55	-1690	27	III	-1105	-1266	24	III
-441-625	-1680	27	III	-1166	-1285	24	III
-444	-1881	27	III	-1260	-1300	24	III
-2-240-5	-161-7532	27	III	-1266	-1306	24	III
-38	-166-1602	27	III	-1285	-1348	24	III
-18	-1683	27	III	-1300	-1350	24	III
-15	-1684	27	III	-1306	-1360-10	24	III
-80	-1691	27	III	-1348	-30	24	III
-1000	-1692	24	III	-1350	-1361-10	24	III
-1730	-1684	24	III	-1360	-310	24	III
-2160	-1691	24	III	-310	-310	24	III
-2345	-1692	24	III	-310	-310	24	III
-2360	-1707	24	III	-310	-310	24	III
-2500	-1684	24	III	-310	-310	24	III
-2745	-1694	27	III	-310	-310	24	III
-3760	-1697	24	III	-310	-310	24	III
-2820	0 8010-168-4430	27	III	-310	-310	24	III
-T-180	-4404	27	III	-310	-310	24	III
-186	-161-7428	27	III	-310	-310	24	III
-485	-124-5176	27	III	-310	-310	24	III
-600	-180-1659	27	III	-310	-310	24	III

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24 September 1956

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612-1-1050-10	27	11
-1900	27	11
-2175-10	27	11
-2200	27	11
-2310	27	11
-2378	27	11
-2500	27	11
-2850-378	27	11
-2882	27	11
-3080	27	11
-5048	27	11
-1045-10	27	11
-40	27	11
-1085	27	11
-1100	27	11
-1-1000-10	27	11
-100	27	11
-200	27	11

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SERVAVIST 6460-1
24 September 1956Elements of a Labeling Process

1. General. All materials should be labeled whether or not they are considered toxic, flammable, or explosive. This is desirable, not only to prevent untoward incidents but also to conserve material which would otherwise be discarded and wasted if unlabeled. Hazardous chemicals and materials within the scope of this instruction have been grouped into six general classifications defined as follows:

a. Class I. Fire Hazard (Flammable). Any material which alone or in combination with other materials may produce a danger of fire or explosion (such as the strong oxidizing agents, perchlorates, peroxides, naphthas, acetone, ether, etc.).

b. Class II. Toxic and Fire Hazard. Any material which presents a combined hazard due to its flammability (Class I) and its toxicity (Class III).

c. Class III. Toxic. Any industrial or military material which may give off a harmful vapor, dust, fume, or mist during handling or operations. The injurious effect may arise from one exposure (acute) or from repeated exposures over a prolonged period (chronic). The mode of entry into the body may be by ingestion, inhalation, or absorption through the skin. Examples of this class are chlorinated hydrocarbons (carbon tetrachloride, tetrachloroethylene, trichloroethylene), chlorinated diphenyls, compounds of radium, mercury, chromium, lead, and organic phosphorus compounds.

d. Class IV. Poisonous. A poison is commonly understood to be a product which will lead to fatal results in a short period of time when taken into the body. Oral intake is the primary mode of entry into the body. It is now recognized that other routes such as inhalation and absorption through the skin may produce the same effect as oral ingestion of some materials. Examples of this category are cyanides, arsenicals, carbon disulphide, and dimethyl sulphate. Some of these materials may give off a deadly vapor when mixed with acids; e.g., cyanide and acid.

e. Class V. Corrosive. Agents which in contact with tissues of the body surface will cause injury or destruction of these tissues. Among these are corrosive agents such as hydrochloric, acetic, nitric, and sulfuric acids; and sodium, potassium, and ammonium hydroxides.

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SECNAVINST 4240-3
24 September 1956

f. Class VI. Radioactive Hazard. Hazardous materials or chemicals which emit alpha, beta, gamma, or neutron radiation, or which may give off dusts, fumes, gases, or vapors emitting these radiations.

2. It may be necessary on occasion for qualified investigators to work with new products before adequate chemical, physical, and toxicological data are available. To cover such cases, and such cases only, the following guide is suggested for preparing labels to be used during the period of investigation:

(NAME OR DESCRIPTION OF PRODUCT)

FOR INVESTIGATIONAL USE ONLY

STATEMENT OF KNOWN HAZARDS

(Appropriate precautionary measures.)
(Appropriate instructions in case of contact or exposure.)

DISCLAIMER: The chemical, physical, and toxicological properties of this product have not been fully investigated and its handling or use may be hazardous.

EXERCISE DUE CARE.

3. The elements of an effective labeling program consist of:

- a. Establishment of a Chemical Control Committee.
- b. Uniformity of labeling.
- c. Indexing of materials and their labeling category.
- d. Proper labeling by the local supply department.
- e. Proper labeling by the using unit where transfer is made to smaller containers.
- f. Educational program.

4. A Chemical Control Committee or equivalent thereof should be established at each activity to administer the technical phases of the labeling program for the local activity and to make revisions as necessary to keep the program current. Directives should be prepared by the Chemical Control Committee for promulgation by the commanding officer. These should be based on Bureau instructions.

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24 September 1956

and should be tailored to suit the needs of each activity. The size and nature of the activity will be major factors in determining whether this Committee will be a formal organization composed of cognizant personnel, or whether it will consist of one individual to whom this additional responsibility is delegated.

5. To provide uniformity of labeling throughout the Naval Establishment a "Label Classification Guide" showing the proper labels to be employed for hazardous materials will be published in U. S. Navy Safety Publications (OPNAV 34-P1). A supplementary list of all new or proprietary materials will be compiled periodically, and will be published in OPNAV 34-P1. To supplement the listings in OPNAV 34-P1 a tentative labeling category, agreed upon by the Chemical Control Committee or equivalent thereof, should be established for each new or proprietary material brought in for use at the local activity. If any given new material presents more than one type of hazard, the labels properly identifying each hazard should be affixed to the container. Assistance in regard to the classification of new or proprietary chemicals may be obtained from the management bureau.

6. The supply officer of each activity shall be responsible for the proper labeling of all containers of hazardous materials on receipt of these materials.

7. Supervisory personnel shall be responsible for the proper labeling of any containers to which hazardous materials may be transferred after issue by the Supply Department.

8. Cognizant management personnel shall institute an educational program to thoroughly familiarize employees with the labeling program, paying particular attention to the significance of the color coding, the insignia, and key words, on each category of label.

C20543

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Exhibit 24

Fifth Edition (Fourth Revision)

WARNING LABELS

*A Guide for
the Preparation of
Warning Labels for
Hazardous Chemicals*

MANUAL L-1

FOURTH REVISION - 1956

Published by
**MANUFACTURING CHEMISTS
ASSOCIATION, INC.**

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Address

Company

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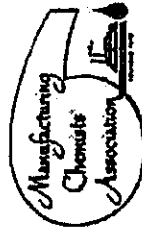
WASHINGTON 6, D. C.

WARNING LABELS

*A Guide for the
Preparation of Warning Labels
for Hazardous Chemicals*

MANUAL L-1

Fourth Revision—1956



PRICE ONE DOLLAR

Published by

MANUFACTURING CHEMISTS' ASSOCIATION, INC.
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Manufacturing Chemists' Association, Inc.

ADOPTED1945
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SECOND REVISION.....1949
THIRD REVISION.....1953
FOURTH REVISION...1956

The information, recommendations and illustrative labels contained in this Manual have been compiled from sources believed to be reliable and to represent the best current opinion on the subject. No warranty, guarantee or representation is made by the Association as to the absolute correctness or sufficiency of any information, recommendations or illustrative label contained in this Manual, and Manufacturing Chemists' Association, Inc. assumes no responsibility in connection therewith; nor can it be assumed that all warnings and precautionary measures are contained in this Manual, or that other or additional measures may not be required under particular or exceptional conditions or circumstances.

WARNING LABELS

A Guide for the Preparation of Warning Labels for Hazardous Chemicals

Introduction

THE DEVELOPMENT of new chemical products and the introduction of chemical processes into ever-widening fields have accentuated the need for furnishing appropriate information in those cases where there are hazards requiring special precautions. Precautionary information should, so far as practicable, reach every person using, handling, or storing chemicals. The most practical means for the seller to disseminate this information appears to be by warning labels affixed to containers of hazardous chemicals, bearing appropriate precautionary statements expressed as simply and briefly as circumstances permit. Such labels, however, cannot take the place of the education of employees regarding chemical hazards and the use of safety clothing and equipment which are and must remain the direct responsibility of employers; nor can the wording on these labels be expected to cover complete information as to the properties of the chemicals nor the complete details for handling chemicals under all conditions. Such information may be found in producers' technical bulletins or in the Manufacturing Chemists' Association's Chemical Safety Data Sheets.

Many chemicals present no hazards in normal handling and storage and for these products no precautionary statements are necessary on the label.

To achieve uniform and more adequate labeling of hazardous chemical products, the Labels and Precautionary Information (LAPI) Committee of the Manufacturing Chemists' Association, Inc., has prepared this Manual for the benefit and guidance of its members. Part I sets forth principles for the preparation of warning labels. Part II contains suggested warning labels for specific chemicals illustrative of the application of these principles. Part III contains suggested warning labels showing the application of the principles of Part I to a group of chemical products used in the pesticide (economic poisons) field.

The Surgeon General of the United States Public Health Service has discontinued the labeling agreements entered into some years ago with the manufacturers of a few specific chemicals. This was done because today adequate precautionary labels are in very general use by chemical manufacturers. The United States Public Health Service has approved the principles of precautionary labeling developed by the Manufacturing Chemists' Association, Inc., and will continue its interest in this field in cooperation with the Association. It is felt that cooperation on the present broad basis will best serve the purpose intended when the earlier more specific agreements were made.

Individual statutes, regulations or ordinances may require that particular information be included in a label or that a specific label be affixed to a container, but for the most part these labels follow LAPI principles. In each case, the requirements of these laws should be studied. *The warning labels suggested in this Manual should be used in addition to, or in combination with, any label required by law.**

*Federal statutes and regulations affecting the labeling of chemical materials include *Federal Caustic Poison Act* and regulations; *Federal Insecticide, Fungicide, and Rodenticide Act* and regulations; *Federal Food, Drug and Cosmetic Act* and regulations; *Interstate Commerce Commission Regulations for Transportation of Explosives and Other Dangerous Articles* and others. Copies are obtainable at nominal cost from the Superintendent of Documents, Washington, D. C., or directly from the agencies that administer the laws.

State and local governments frequently regulate labeling through statutes, ordinances, and regulations affecting industrial chemicals; poisons; insecticides, fungicides, rodenticides, and herbicides; foods, drugs, and cosmetics; agricultural and horticultural materials; the practice of pharmacy; and other subjects. Copies are usually obtainable from state or local Departments of Health, Agriculture, Pharmacy, or other regulatory agencies.

Terms as Used in this Manual

Dust¹—Solid particles generated by handling, crushing, grinding, rapid impact, detonation and decrepitation of organic or inorganic materials such as rock, ore, metal, coal, wood, grain, etc. Dusts do not tend to flocculate except under electrostatic forces. They do not diffuse in air but settle under the influence of gravity.

Fume²—Solid particles generated by condensation from the gaseous state, generally after volatilization from molten metals, etc., and often accompanied by a chemical reaction such as oxidation. Fumes flocculate and sometimes coalesce.

Mist³—Suspended liquid droplets generated by condensation from the gaseous to the liquid state or by breaking up a liquid into a dispersed state, such as by splashing, foaming and atomizing.

Gas—A normally formless fluid which occupies the space of enclosure and which can be changed to the liquid or solid state by the effect of increased pressure or decreased temperature or both. A gas diffuses.

Vapor—The gaseous form of a substance which is normally in the solid or liquid state. A vapor diffuses.

FLAMMABLE LIQUID¹—Any liquid which gives off flammable vapors (as determined by flash point from Tagliabue's open-cup tester, as used for test of burning oils) at or below a temperature of 80°F.

EXTREMELY FLAMMABLE LIQUID—Any liquid which gives off flammable vapors (as determined by flash point from Tagliabue's open-cup tester, as used for test of burning oils) at or below a temperature of 20°F.

CORROSIVE (Physiological)—An agent which in contact with living tissue will cause more or less severe destruction of tissue by chemical action. As used in warning labeling, the term "corrosive" refers to action on living tissue and should not be confused with action on inanimate surfaces such as metals, glass or wood.

IRRITANT (Physiological)—An agent which in contact with living tissue will induce either immediately or after prolonged or repeated contact a more or less severe local tissue reaction not leading directly to destruction of tissue.

Sensitizer (Physiological)—A material which, as ordinarily handled does not necessarily cause any discernible reaction in living tissue but which after initial or repeated contact with the tissue of some individuals may, at a later date, produce a prompt inflammatory reaction on contact, even in minute amounts, with the tissue of the same individuals.

Poison² Note: The true determination of the "poisonous" properties of a chemical or mixture of chemicals must be based on its effect on humans. The collection of adequate data from human experience is usually impossible. In the absence of such data it is desirable to establish for labeling purposes some arbitrary standards based on past experiences and some methods of testing which will permit the presumption of the possible hazards inherent in a given product. The use of laboratory animals for this purpose is now considered the most reliable method generally available when conducted under controlled conditions.

A poison is commonly understood to be a product, contact with which will lead to fatal results, usually in a short period of time. Generally only oral intake has been considered. It is becoming more generally recognized, however, that other modes of contact or routes of entry, in particular inhalation and absorption through the skin, may have similar fatal effect. Any use of the term should, therefore, consider these three common routes of entry.

—A chemical or mixture of chemicals which falls within any of the following categories:

- (a) Produces death within 48 hours in half or more than half of a group of 10 or more laboratory white rats weighing 200-300 grams at a single dose of 50 milligrams or less per kilogram of body weight, when administered orally; or
- (b) Produces death within 48 hours in half or more than half of a group of 10 or more laboratory white rats weighing 200-300 grams, when inhaled continuously for a period of one hour or less at an atmospheric concentration of 2 milligrams or less per liter of gas, vapor, mist, or dust, provided such concentration is likely to be encountered by man when the chemical product is used in any reasonably foreseeable manner; or
- (c) Produces death within 48 hours in half or more than half of a group of 10 or more rabbits tested in a dosage of 200 milligrams or less per kilogram body weight, when administered by continuous contact with the bare skin for 24 hours or less.

If available data on human experience with any chemical in the above-named concentrations indicate results different from those obtained on animals, the human data shall take precedence.

Toxicity—The inherent capacity of a substance to produce bodily injury by other than physical means.

Hazard—The risk of injury, illness, or damage that is encountered during reasonably anticipated handling and use of a substance. Hazard is determined by such factors as toxicity, physical characteristics and conditions of use and may not be in direct proportion to toxicity alone.

Mixture—A physical commingling of two or more substances which may or may not bear a fixed proportion to one another and which have not reacted chemically with one another.

Economic Poison—Any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insects, rodents, fungi, weeds, and other forms of plant or animal life or viruses, except viruses on or in living man or other animals, which the Secretary (of Agriculture) shall declare to be a pest.

Pesticide—Same as Economic Poison.

1. Corresponds to ICC definition.
2. As defined in Chapter 11 "Engineering Control of the Air Contamination of the Working Environment" (Allen D. Brandt, D.Sc.) page 198, "Manual of Industrial Hygiene," USPHS.
3. Substantially identical with ICC Poison Class B definition and similar in most respects to regulations under the Federal Insecticide, Fungicide and Rodenticide Act.
4. From Federal Insecticide, Fungicide and Rodenticide Act. It should be understood that there are laws, ordinances, and regulations in certain states which declare to be pests things which may not be so considered at present under the Federal Act.

PART I

Preparation of Warning Labels

General Principles

In preparing warning labels, the following general principles should serve as a guide:

- (1) Each chemical product presents a distinct problem and must be treated individually in the light of its own characteristics. Conclusions regarding the hazards of a product cannot safely be drawn either from the properties of the materials from which it is formed or by analogies based upon chemical structure.

Mixtures of two or more chemicals may have properties that vary in kind or degree from those of the individual components. Any warning label for mixtures should be based on the properties of the finished product.

Impurities may contribute hazardous properties and should not be overlooked.

- (2) All statements on warning labels should be brief, accurate, and expressed in simple, easily understood terms.

- (3) Precautionary labeling should be used only when and to the extent necessary. The language should be practical, not based alone upon the inherent properties of a product, but directed toward the avoidance of hazards resulting from such use, handling and storage as may reasonably be anticipated. The use of warning labels for relatively harmless products or the use of unnecessary words will develop a disregard for labels and defeat their purpose as surely as will failure to give adequate notice of hazards.

- (4) On labels for different products, uniformity in language to indicate the same hazards and same degree of hazard is most desirable in order to gain greater understanding through standardization.

- (5) The following subject matter should be considered for inclusion on a warning label:

- A. Name of Product
- B. Signal word designating degree of hazard—DANGER!, WARNING!, or CAUTION!

- C. Affirmative statement of hazards.

- D. Precautionary measures covering actions to be followed or avoided.

- E. Instructions in case of contact or exposure, where advisable. (Note: Under some laws antidotes are required when the word "POISON" is used.)

Instructions for the handling and storage of containers should also be considered for inclusion on the label. This is information relating to characteristics of the container as well as those of its contents, and is discussed separately under *Container Handling and Storage Instructions*, page 20.

- (6) The inclusion of the word "POISON" and the skull and crossbones on a label should be limited to those cases where the product is a poison according to a definite toxicity standard* or where such use is prescribed by law. When used, this legend should be in addition to the other label warnings and should not take the place of the signal words DANGER!, WARNING!, and CAUTION! which are designed to show the relative degree of hazard.

- (7) A non-descriptive code designation or trade name should not be used as the only identification of a hazardous chemical. If the complete chemical name is not shown, the label should clearly state the type of chemical, e.g., "corrosive acid," "lead compound."

- (8) Warning statements should be grouped together in a prominent location on the label and should be printed in easily legible type which is in contrast by typography, layout, or color with other printed matter on the label. The label should be affixed firmly to and in a conspicuous place on the container.

Preparation of Label

In the preparation of a warning label, the compilation of all available relevant information on the product is a necessary first step. An adequate knowledge of the toxicity of the material (obtained from the literature or through laboratory tests) and data on physical and chemical properties, packaging, and methods of handling and use of the product are needed to make possible a description of the hazards. In the case of an established product advantage should be taken of the experience of people involved in manufacturing, shipping, and using.

*See terms page 8.

the material. All the *General Principles* should be kept in mind and the following information considered for inclusion on the label:

A. NAME OF PRODUCT This is important information for the safety of handlers and users. It is preferable that the chemical name of the product be used. The recommendations of the American Chemical Society for nomenclature should be followed. Trade names may be used in addition to chemical names. A non-descriptive code designation or trade name should not be used as the only identification of a hazardous chemical. If the complete chemical name is not shown, the label should at least clearly state the type of chemical, e.g., "corrosive acid," "lead compound."

B. SIGNAL WORD This word is intended to draw attention to the presence of hazard, and to indicate the degree of severity. The signal words recommended are, in the order of diminishing severity of hazard:

- (1) DANGER!
- (2) WARNING!
- (3) CAUTION!

Degree of severity can be expressed only in relative terms. "Danger" is the strongest of the three words and should be used for those products presenting the most serious hazards. "Caution" is recommended for those compounds presenting the least serious hazards. "Warning" is intermediate between "Danger" and "Caution." Reference to the illustrative labels in Part II of this Manual will help in the selection of the proper signal word.

C. STATEMENT OF HAZARDS This statement should give notice of the hazards that are present in connection with the customary or reasonably anticipated handling or use of the product. Examples are:

CAUSES BURNS VAPOR EXTREMELY HAZARDOUS

Many chemical products will present more than one type of hazard, in which case appropriate statements for each significant type should be included on the label. In general, the most serious hazard should be stated first.

While any compound may be hazardous if improperly used, it is impractical to cover every possible contingency on a label. Efforts should be directed toward giving notice of the significant hazards. A minor hazard may frequently be covered clearly and briefly by an appropriate precautionary statement alone. In some cases the total

hazard of a product, while justifying one or more precautionary measures, may be of such order as to require no statement of hazard on the label.

D. PRECAUTIONARY MEASURES These instructions are intended to supplement the statement of hazards by setting forth briefly measures to be taken to avoid injury or damage from stated hazards. Examples are:

Keep away from heat and open flame.
Avoid breathing dust.

Precautionary measures may be included for hazards not considered of sufficient importance to require mention in the statement of hazards.

Statements similar to, "Do not take internally," deserve special attention. They are seldom necessary where the precautionary measure to be followed is obvious as, for example, when the product is labeled "Poison" or the statement of hazards contains the words, "may be fatal if swallowed." On the other hand, the instruction may be desirable if the name, appearance, use or other attributes of the chemical are likely to result in its being taken orally through accident or mistaken identity.

E. INSTRUCTIONS IN CASE OF CONTACT OR EXPOSURE The primary purpose of a warning label is to *prevent* injury or damage. However, instructions in case of contact or exposure may be included in those instances where the results of contact or exposure are severe and immediate treatment is highly desirable, and where simple remedial measures may be taken safely by non-professional persons before medical assistance is available.

Instructions should be limited to recognized first aid procedures based on simple methods and commonly available materials. Instructions for strictly medical treatment should be omitted except when specifically required by law or indicated by special circumstances.

Because of the serious and lasting effects that may result from eye injuries, a recommendation to get medical attention should accompany any specific instructions directed to treatment of the eyes.

In certain instances simple remedial measures such as washing, or removal of clothing, may be included where they will serve to avoid serious injury following contact or exposure.

All precautionary information should appear on the label as a unit and should be printed in the order given above. The labels in Parts II

and III illustrate suitable arrangements and indicate relative prominence that should be given to the individual statements. Such relative prominence may be achieved in a number of ways such as by variation in type size, color, or layout of the printed material.

NOTE: Some state laws and regulations require, on labels, the use of special or strictly defined antidotes or prescribe special ways in which these must be shown for certain chemicals. The requirements for any given poison may, therefore, vary greatly and the impossibility of showing, in the illustrative labels, antidotes which might be nationally acceptable has led to the practice of indicating only the need for an appropriate "First Aid—Antidote" statement where the "POISON—skull and crossbones" legend is used.

Table 1, on Page 16, is intended as a guide in the selection of precautionary statements for warning labels. Listed are classifications of materials according to the hazardous properties most frequently encountered in chemical products. Opposite each classification are given statements of hazard, precautionary measures and, in most cases, instructions in case of contact or exposure. It is important to recognize that chemicals can have inherent in them more than one of such hazardous properties, and that the label wording for such products should include an appropriate combination of the pertinent statements.

As each chemical product must be treated individually in the light of its own characteristics and customary or reasonably anticipated handling or use, there will be many instances in which the illustrative statements in Table 1 will not be applicable, either because they do not accurately express the degree of hazard or because they fail to cover the particular characteristics. In such cases, suitable statements should be chosen to fit the situation. The illustrative labels in Part II of this Manual may be helpful in the choice of appropriate wording.

Use of Table 1 by Specific Example

To illustrate the preparation of a specific warning label and the use of Table 1 in accordance with the principles outlined in the preceding text, Acetyl Chloride may be selected as an example.

Analysis of the physical, chemical and toxicological data shows the major hazards to consist of flammability (flash point between 20°F. and 80°F.), and a severe burning action on living tissue. A chemical property which is of secondary importance is the relatively violent action in contact with water, particularly when small amounts of water are added to large quantities of the chemical. Thus, two major and one minor hazard must be considered.

The selection of the signal word depends on the seriousness of the hazards, the acute rather than chronic action, and to a lesser extent on the number of hazards. In the case of Acetyl Chloride, both major

hazards are serious and acute. Therefore, the signal word "DANGER" is indicated. (See page 12, B.)

Flammability is covered by Column 1, Class I. Since the flash point is between 20°F. and 80°F., Acetyl Chloride falls in Type B, for which the statement of hazard (Column 2) is:

FLAMMABLE

The second major hazard is the corrosive action on living tissue which is covered in Column 1, Class VII. Since the burns that result from contact are serious, the statement of hazard chosen from Column 2 is:

CAUSES SEVERE BURNS

The precautionary measures applying to the flammability hazard are chosen from Column 3. (The parenthetical word "sparks" is usually used only when the flash point is below 20°F.) The statements selected for this product are:

Keep away from heat and open flame.

Keep container closed.

The precautionary measures corresponding to the corrosive action of the liquid and vapor on living tissue, selected from Column 3, are:

Do not get in eyes, on skin, on clothing.

Avoid exposure to concentrated vapor.

The applicable instructions in case of contact or exposure are chosen from Column 4:

In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention.

The minor hazard arising from the relatively violent action of Acetyl Chloride in contact with water is covered by the special precautionary statement:

Do not allow water to get into container.

Assembling the various statements in order, *Signal Word, Statement of Hazard, Precautionary Measures, and Instructions in Case of Contact*, we have the completed label as follows:

ACETYL CHLORIDE

DANGER! FLAMMABLE

CAUSES SEVERE BURNS

Keep away from heat and open flame.

Keep container closed.

Do not get in eyes, on skin, on clothing.

Avoid exposure to concentrated vapor.

In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention.

Do not allow water to get into container.

TABLE 1 Case 1:11-cv-00406-LEK-RLP Document 8-8 Filed 06/30/11 Page 12 of 16 PageID #7

Products will be encountered that present hazards varying in kind or degree from listed. Appropriate statements of hazard, precautionary measures and instruction, case of contact or exposure should be prepared on the basis of the properties of the product, following the pattern and general phrasing of the following table. Parenthetical words in the table express variations in kind or degree and are to be used where appropriate. SEE EXAMPLE PAGE 14.

Class of Hazard	Statements of Hazard	Precautionary Measures	Instructions in case of Contact or Exposure
I. Liquids Boiling at 150°F. or Below (Flash points are determined by the Tagliabue Open-Cup Method) A. Flash point 20°F. or below B. Flash point above 20°F. to 80°F. inclusive C. Flash point above 80°F. to 150°F. inclusive	Extremely Flammable Flammable [Combustible]*	Keep away from heat (sparks) and open flame. Keep container closed (end away from heat). Use with adequate ventilation.	IMPORTANT! Select applicable statement(s) only. Selection(s) to be based on actual hazards of use and degree of hazard. In some instances the inclusion of a precautionary statement may be justified where the measure to be followed is obvious from the statement of hazard.
II. Oxidizing Agents	Strong Oxidant Contact with Combustible (Other) Material May Cause Fire	Store separately (away) from and avoid contact with combustible (other) materials. Avoid contamination of clothing as it becomes dangerously flammable when dry. Keep container closed (end away from heat). Avoid contact with skin and eyes.	In case of contact, immediately flush skin or eyes with plenty of water for (at least) 15 minutes; for eyes, get medical attention. (Wash clothing thoroughly if soiled.) Sweep up spillage at once. Flush or absorb spillage with . . .
III. Materials Giving Vapors Highly Toxic or Extremely Irritating on Exposure for a Short Time or to Low Concentrations	Vapor [Extremely] Hazardous (Irritating) Hazardous Liquid and Vapor (Gas under Pressure) Vapor Poisonous if Inhaled Vapor May Be Fatal if Inhaled [See NOTE opposite page]	Do not breathe vapor. Do not get in eyes, on skin, on clothing. Use only with adequate ventilation. Keep container closed (end away from heat). Have air line respirator or self-contained oxygen respirator available for emergency.	In case of contact, immediately flush skin or eyes with plenty of water for (at least) 15 minutes; for eyes, get medical attention. Remove and wash clothing before re-use. [See NOTE above]
IV. Materials Giving Vapors Hazardous from Prolonged or Repeated Exposures or Exposure to High Concentrations	Vapor Harmful Causes Irritation of Eyes, Nose, and Throat	Use only with adequate ventilation. Avoid (prolonged or repeated) breathing (of) vapor. Avoid contact with skin, eyes, and clothing. Keep container closed (end away from heat).	If spilled on clothing, remove and wash before re-use. In case of exposure to high concentrations, remove to fresh air.
V. Gases and Vapors Physiologically Inert	Gas (Vapor) Reduces Oxygen Available for Breathing Releases Heavy Gas (Vapor) which May Cause Suffocation	Use with adequate ventilation. Keep container closed. Do not enter storage areas unless adequately ventilated.	If affected by exposure, remove to fresh air. If breathing has stopped, apply artificial respiration.
VI. Materials in Dust Form Hazardous from Inhalation or Contact	Hazardous (Harmful) Dust Harmful if Inhaled Causes Irritation of Skin, Eyes, Nose, and Throat	Do not breathe dust. Avoid breathing dust. Wash thoroughly before eating or smoking. Avoid contact with skin, eyes, and clothing.	In case of contact, [immediately] flush skin or eyes with plenty of water for (at least) 15 minutes; for eyes, get medical attention. (Remove and wash clothing before re-use.)
VII. Skin Irritants - Corrosive	Causes Severe Burns Causes Burns May Cause Burns	Do not get in eyes, on skin, on clothing. Avoid contact with skin, eyes, and clothing. Avoid exposure to (concentrated) vapor.	In case of contact, immediately flush skin or eyes with plenty of water for (at least) 15 minutes; for eyes, get medical attention. (Remove and wash clothing before re-use.)
VIII. Materials Causing Skin Irritation after Prolonged or Repeated Contact	Causes Skin Irritation May Cause Skin Irritation	Avoid (prolonged or repeated) contact with skin. Wash thoroughly before eating or smoking. Avoid exposure to (concentrated) vapor.	In case of contact, flush with (plenty of) water; for eyes, get medical attention.
IX. Materials Toxic through Skin Absorption	[Extremely] Hazardous (Harmful) Solid (Liquid) [Rapidly] Absorbed through Skin [See NOTE opposite page]	Do not get in eyes, on skin, on clothing. Avoid contact with skin, eyes, and clothing.	In case of contact, immediately remove all contaminated clothing and flush skin or eyes with plenty of water for (at least) 15 minutes; for eyes, get medical attention. Wash clothing before re-use. [See NOTE above]
X. Materials Toxic if Swallowed	Poisonous if Swallowed May Be Fatal if Swallowed Harmful if Swallowed [See NOTE opposite page]	Wash thoroughly before eating or smoking. Wash thoroughly after handling. Do not breathe dust (vapor). Avoid breathing dust (vapor). Do not take internally [See Precautionary Measures, Pg. 13].	[See NOTE above]

Labels for Small Commercial Packages

The principles governing the preparation of warning labels discussed in Part I and the illustrative labels in Part II of this Manual have been developed primarily for bulk packages of chemicals intended for industrial use. The general principles apply, however, to chemicals packaged in small containers. These may include, among others, chemical products in retail packages intended for the ultimate consumer; highly purified chemicals intended for research, testing, or control; and chemicals intended for professional use such as in pharmacy.

As stated in the *General Principles* on page 10, each chemical product presents a distinct problem and must be treated individually in the light of its own characteristics. This same principle will apply to small containers. Small containers may present a problem of less available space for labeling purposes. Careful and selective shortening of warning statements for such containers may be in order if necessary to permit legibility, or if the wording on labels for the chemical in industrial packages is not applicable. Consideration should always be given to (1) the intended or reasonably anticipated handling or use of the particular product, (2) the training and experience of the expected user and (3) the extent to which the hazard is modified by the size or type of container.

The following principles are recommended for condensation of suggested label wording where necessary or advisable:

- (1) Retain the *Signal Word*;
- (2) Retain the *Statement of Hazards*, shortened if necessary to a practical equivalent;
- (3) Consider omission of *Precautionary Measures* if they are clearly indicated or implied from the *Statement of Hazards* or can be clearly indicated or implied by revising the *Statement of Hazards*;
- (4) Consider omission of wording relating to hazards that may be less serious because of the particular characteristics of the package, the nature of the use, and the training and experience of the user. Care must be taken to include precautionary measures for any additional hazard which may be present as a result of such characteristics, use, or training and experience.
- (5) Care should be taken that labels prepared in accordance with the above principles include all information required by law (see footnote on page 6).

Labels for Samples and for New Products for Investigational Use

Samples:

In general, the label for samples of a product should bear the same precautionary information that is on the commercial label, with the exception of possible differences in container instructions. If the product is not in commercial production the label for samples should be prepared in accordance with the principles stated in this Manual.

New Products for Investigational Use:

Chemical, physical and toxicological data should be obtained on any product before it is distributed so that hazardous properties can be described on the label. However, it may occasionally be necessary to make delivery of a new product for investigational use before all of these data are obtained. For instance, the quantity available may be too small for necessary tests or the product may have to be delivered to investigators for the purpose of obtaining the desired information. These deliveries should be made to qualified investigators only and should be labeled as adequately as possible with the information available. To cover such cases (and such cases only) the following guide is suggested for preparing labels to be used during the period of investigation.

NAME OR DESCRIPTION OF PRODUCT

FOR INVESTIGATIONAL USE ONLY

SIGNAL WORD! STATEMENT OF KNOWN HAZARDS

Appropriate precautionary measures

Appropriate instructions in case of contact or exposure

IMPORTANT! The chemical, physical, and toxicological properties of this product have not been fully investigated and its handling or use may (be hazardous) (present additional hazards). Exercise due care.

Container Handling and Storage

Care should always be exercised in handling and storing containers of hazardous chemicals and in removing the contents. The Container Committee of the Manufacturing Chemists' Association, Inc., has recommended the general precautions given below for handling and storing certain classes of containers. Applicable phrases may be selected from these statements. These may be used either as separate labels or in combination with the warning labels given in Part II. Where the properties of the chemical require special or additional precautions, such instructions are indicated in some instances in conjunction with the individual label in Part II.

Metal Drum Handling and Storage (for liquids and semi-liquids)

- Keep plug up to prevent leakage.
- Keep drum out of sun and away from heat.
- Relieve internal pressure when received and at least weekly thereafter by slowly loosening plug. Retighten immediately.
- Never use pressure to empty.
- Keep lights, fire, and sparks away from drum openings.
- Drum must not be washed out or used for other purposes.
- Replace plug after each withdrawal and return with empty drum.
- In case of spillage, flush with plenty of water.

Glass Carboy Handling and Storage

- Before moving carboy be sure closure is securely fastened.
- Loosen closure carefully.
- Keep out of sun and away from heat.
- Never use pressure to empty.
- Completely drain carboy before returning.
- In case of spillage, flush with plenty of water.

Wooden Barrel Handling and Storage (for liquids and semi-liquids)

- Keep out of sun and away from heat.
- Store with bilge bung up.
- Never use pressure to empty.
- Drain completely.
- Keep barrel moist—shrinkage may cause leaks.
- In case of spillage, flush with plenty of water.

Cylinder Handling and Storage

- Keep away from heat.
- Do not store in sunlight.
- Never drop cylinders.
- Be sure connections are tight.
- ICC Regulations prohibit refilling cylinder without permission of owner.
- Have airline respirator or self-contained oxygen respirator available for emergency.

Aerosol Containers

Aerosols in metal cans are used so widely in both industry and in the home that their appropriate labeling is of concern to all. This new type of container for products under pressure should receive more care in handling and storage than the ordinary sealed can under little or no pressure at normal temperatures.

The Precautionary Labeling Committee of the Chemical Specialties Manufacturers Association (50 East 41st Street, New York 17, New York) reviewed the matter carefully and in March 1954 proposed that the following labeling be used on all aerosol metal can containers:

WARNING!

- Contents under pressure. Do not puncture.
- Exposure to high temperatures may cause bursting.
- Keep at room temperature—away from direct sunlight, radiators, stoves, hot water and other heat.
- Never throw container into fire or incinerator.

NOTE: Additional requisite cautions for statements as to hazards to persons and property, the safe discharge of contents, etc., will depend upon the particular product.

Appropriate modification of this labeling is suggested for aerosol containers made of other materials.

MANUAL L-1 4th REVISION

1956

The Following Label Changes Have Been Made In The 4th Edition

PART II

LABELS ADDED

Aluminum Chloride, Anhydrous
Arsenic Trioxide
Dioxethylenamine, Anhydrous
Hydrogen Peroxide (Over 52%)
Phenylendiamine (Meta)
Phthalic Anhydride
Propylene
Trimethylamine, Anhydrous

LABELS REVISED

Acetic Anhydride
Barium Nitrate
Benzene
Carbon Tetrachloride
Chromic Acid

Dichloroethyl Ether
Diethylenetriamine
Ethylmethylamine
Hydrofluoric Acid Anhydrous
Mercuric Chloride
Lead Acetate
Methanol
Morpholine
Perchloric Acid
Sodium Chlorate
Sodium Hydroxide
Sodium Sulfide
Vinyl Chloride

LABELS DELETED

Arsenic Trichloride
Calcium Cyanide

PART III

LABELS ADDED

Antimony Potassium Tartrate
Aramite
Caplan
Chloranil
Chloro-IPC
p-Chlorophenyl p-Chlorobenzenesulfonate
Copper Compounds
Dalapon
Dichlorone
Dichlorodiphenyl Dichloroethane
Dinitro-ortho-Cresol
Endrin
Ethyl Mercury Acetate
Glyodin
Heptachlor
Hypochlorites
IPC
Malathion
MCP
Methyl Mercury Dicyandiamide
Methyl Parathion
Phenyl Mercury Acetate
Potassium Cyanate
Sodium Trichloroacetate
Thallium Sulfate
Waxflarin
Zinc Phosphide

LABELS REVISED

Aldrin
Antu
Barium Fluosilicate
Calcium Arsenate
Calcium Cyanide
Carbon Tetrachloride
Chlordane
Cresol
Cyanides, Inorganic
Dichlorodiphenyl Trichloroethane
Dichloroethyl Ether
Dieldrin
Ethyl Mercury Chloride
Ethyl Mercury Phosphate
Ethyl Mercury para-Toluene
Sulfonamide
Hydroxymethylchlorophenol
Hydroxymethylresorcinol
Hydroxymethylnitrophenol
Lead Arsenate
Magnesium Arsenate
Nabam
Paris Green
Phenyl Mercury Oleate
Sodium Chlorate
Strychnine
Zinc Arsenite

LABELS DELETED

Leadon Purple

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PART II

Illustrative Warning Labels for Industrial Chemicals

The warning labels in this section have been prepared to demonstrate the practical application of the principles in Part I to a number of chemical products intended for industrial use. The user should familiarize himself with Part I before adapting any of the label statements contained in Part II to his products. The chemicals were selected to illustrate labeling for the major types of hazards commonly encountered. Consequently the listing covers only a relatively few of the hazardous chemicals for which warning labels are necessary. In many cases these labels are applicable to other products some of which are listed with appropriate cross references.

The labeling of radio-active materials, the increasing use of which presents a number of special hazards, is a complex problem beyond the scope of this Manual. In designing labels for these materials, it is suggested that reference be made to Handbook No. 42 published by the U. S. Department of Commerce, National Bureau of Standards, entitled "Safe Handling of Radioactive Isotopes."

The labels are based on the properties of the named chemicals; the presence of other substances, including impurities, may alter these properties and necessitate additional or different precautionary information.

General information regarding the handling and storage of containers is not included on these labels. This subject is discussed under the heading, "Container Handling and Storage," page 20.

First aid treatment is given for a few products only. Such information may be desirable on other products. Where "clothing" is mentioned in first aid instructions, it should be understood to mean all articles of clothing, including shoes, garters, and other accessories. Shoes are specifically named in some instructions, because of special hazards arising from absorption of the chemical by leather.

The notation, "MCA Chemical Safety Data Sheet available," appearing with certain labels in this section refers to Data Sheets published by the Manufacturing Chemists' Association, Inc. These publications contain detailed information on the chemical, physical, and toxicological properties of the product, as well as information on shipping con-

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containers, labeling, storage, handling and protective equipment. Prior to use, read a complete list of available Data Sheets may be obtained from the Chemical Association. (See page 78 for list.)

The warning labels suggested in this Manual should be used in addition to, or in combination with, any label required by law.

ACETALDEHYDE

**DANGER! EXTREMELY FLAMMABLE
MAY FORM EXPLOSIVE PEROXIDES
UNDER AIR PRESSURE**

Avoid contact with heat, sparks, and open flames. Do not use in areas where smoking is prohibited. Do not use in areas where open flames are prohibited. Do not use in areas where open flames are prohibited. Do not use in areas where open flames are prohibited.

ACETALDEHYDE

DANGER! CAUSES SEVERE BURNS

Avoid contact with skin, eyes, and clothing. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention. Do not get liquid or vapor in eyes, on skin, on clothing. Do not breathe vapor. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention.

ACETIC ACID, 80 %

DANGER! CAUSES SEVERE BURNS

Do not get liquid or vapor in eyes, on skin, on clothing. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention.

MCA Chemical Safety Data Sheet available

ACETIC ACID, 56%-70 %

WARNING! MAY CAUSE BURNS

Avoid contact with skin, eyes, and clothing. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention.

MCA Chemical Safety Data Sheet available

ACETIC ACID, 28 %

CAUTION! MAY CAUSE BURNS

Avoid contact with skin, eyes, and clothing. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention.

MCA Chemical Safety Data Sheet available

ACETIC ANHYDRIDE

**DANGER! CAUSES SEVERE BURNS
VAPOR HARMFUL**

Do not get liquid or vapor in eyes, on skin, on clothing. Do not breathe vapor. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention.

MCA Chemical Safety Data Sheet available

Exhibit 25



DEPARTMENT OF THE NAVY
BUREAU OF MEDICINE AND SURGERY
WASHINGTON 25, D.C.

IN REPLY REFER TO

BUMED-733-PR
A10-1/L5
15 January 1960

From: Chief, Bureau of Medicine and Surgery
To: Activities Submitting Occupational Health Reports (NavMed 576)

Subj: Occupational Health Hazards; Release No. 22

Ref: (a) MANMED 23-21

Encl: (1) List of Occupational Health Hazards (July - September 1959)

1. The Quarterly Occupational Health Reports (NavMed 576) for July through September 1959, submitted in accordance with reference (a), have been reviewed. Potential health hazards of special interest have been selected from these reports and are forwarded herewith as enclosure (1).

2. The compilation contained in enclosure (1) is intended as a ready reference to current problems, and in some instances will help avoid duplication in the solution of these problems. It is also intended to aid Medical Department personnel in the recognition of potentially hazardous materials and processes. Further detailed information regarding specific hazards noted in enclosure (1) may be obtained from the originating activity.

3. The information contained herein on the composition of materials is to be treated as manufacturer's "DISCREET" proprietary information, in accordance with SecNav Instruction 5570.1A of 6 April 1957, and is to be used solely for the control of potentially toxic materials. It is not to be released for any other purpose.

4. The request for information pertaining to the social and scientific activities of personnel engaged in the Occupational Health Program has been favorably received and is appreciated. A subtitle for industrial hygiene services provided the Fleet will be included henceforth under the subtitle "Shipboard Industrial Hygiene Surveys and Investigations".

L. B. Shone
LLOYD B. SHONE
By direction

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Derived from Industrial Health Reports
July 1959 through September 1959

Release No. 22

For Official USE Only

1. Chemical Health Hazards.

A. Inhalation Hazards Due to Gases, Vapors, Fumes and Dusts

1. 1,1,1-Trichloroethane. Following a Medical Admission to the Dispensary an investigation was made on a submarine undergoing repair. The workman involved had been preparing surfaces and brush painting with Plasite Paint Formula No. 7144 in the Sanitary Tank which was about four feet square and six feet deep. No ventilation was provided to the space and the workman had about a pint of the paint in the tank with him. After being in the tank approximately one hour he was found to be unconscious and removed to the Dispensary. A witness said that the workman was wearing an organic vapor respirator at the time of his removal from the tank.

Plasite Paint contains about 35% 1,1,1-Trichloroethane. Other common names for this solvent are Methyl Chloroform, Vythene, Chlorothene and Magslect. 1, 1, 1-Trichloroethane is very volatile, requiring little heat to cause evaporation. Plasite is an epoxy resin type paint and is mixed with an amine hardener prior to application. The exothermic reaction of the mixture may have been a factor in the workmen's exposure. The vapor is heavier than air and therefore tends to displace air in enclosed spaces. The organic vapor respirator worn by the workmen is designed to remove vapors from the air when concentrations do not exceed 1,000 parts per million (ppm). It had a knitted cotton facelet over the contact area between the face and the mask. In testing the efficiency of the respirator it was noted that it was not possible to pull a vacuum by closing off the inlets to the organic vapor cartridges. This indicated that the workman was breathing the contaminated air around the facelet. Because of the potential hazard involved in the Plasite application it was recommended that air supplied respirators and ventilation be provided during such work on interior surfaces. It was also recommended that organic vapor respirators be used only when applying petroleum spirit type paint vehicles and that the facelets be removed prior to issue. (1)

2. A request was received to test the cable tanks and cones of a cable-laying ship for oxygen content and for the presence of any toxic or injurious gases. The request was made because of a casualty occurring on a similar ship operating in the Atlantic. Oxygen valves ranged from 5.5% to 20.4% and carbon dioxide from 11.7% down to 0.0%. Carbon monoxide concentrations of about 5 ppm were found in one tank and its associated cone. Tests for hydrogen sulfide, chlorinated hydrocarbons, arsine, phosgene, nitrous gases, and flammable vapors (19)